Omnia.9

All you can imagine. And more.

Installation & User's Guide

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Omnia®
THE TELOS ALLIANCE

Table of Contents

Getting the Most From This Manual Page 3

Chapter 1: The Omnia.9 Story Page 5

Chapter 2: Quick Startup Guide Page 8

Chapter 3: General Processing Advice Page 12

Chapter 4: Home Screen & User Interface Page 15

Chapter 5: Reading the Processing Meters Page 20

Chapter 6: The Home Menu Page 23

Chapter 7: Input Source Audio Menu Page 25

Chapter 8: Undo Menu Page 29

Chapter 9: FM Menu - Processing for FM Page 40

Chapter 10: FM Menu - Processing for ITU-R BS.412 / MPX Power Limiting Page 69

Chapter 11: FM Menu - RDS Page 73

Chapter 12: FM Menu - MPX Inputs Page 81

Chapter 13: FM Menu Meter Options Page 85

Chapter 14: Studio Processing Menu Page 90

Chapter 15: HD Processing Menu Page 93

Chapter 16: Streaming Processing & Encoding Menu Page 98

Chapter 17: Monitor Output Menu Page 111

Chapter 18: System Menu Page 123

Chapter 19: Getting the Sound You Want Page 150

Chapter 20: Factory Presets Page 154

Chapter 21: NfRemote Client Software Page 161

Chapter 22: Frequently Asked Questions (FAQ) Page 171

Chapter 23: Signal Path Diagrams Page 179

Chapter 24: Specifications & Warranty Page 193

Getting the Most From This Manual

If you read nothing else, read this.

Getting the Most From this Manual

Let's be honest about a few things right up front:

- Omnia.9 offers a lot of power and flexibility, characteristics that inherently bring a degree of complexity along for the ride.
- It's menu and control architecture is logical, but also broad and deep, so we've organized the chapters and their contents in a manner that duplicates the menu structure of the front panel from the big picture (the Home Screen) down to every individual control.
- This is a whopping big document.
- Your time is valuable and limited.

While we'd love for everyone to read this manual cover-to-cover and fully understand all of what Omnia.9 can do, that's just not practical for the majority of users.

Most of you would like to rack it up, plug it in, find a suitable preset for your taste and market, maybe tweak it up a bit, and then try to eat lunch before the really important stuff lands on your desk. Like the virus-plagued laptop from *that* sales guy (again). Or the wireless mic that the intern backed over with the promotions van (again). Or the urinal that won't stop running. You know, the *real* reasons you got into broadcasting.

With that in mind, here's what we suggest:

- **When you're done here, go to Chapter 2, the Quick Start Guide.** This is bare bones stuff including physical I/O, routing the audio within Omnia.9, setting levels, and picking a preset.
- **Read Chapter 22, the FAQ section.** Most users have the same or similar questions. We've attempted to answer those here.
- **Read Chapter 3, General Processing Advice,** especially if you don't consider yourself to be a processing expert. It's a short chapter but has non-technical, non-product-specific tips that will serve as a good foundation as you adjust your sound. This is also good reading for your Program Director, General Manager, or anyone else who may have a say in the overall sound of the station. We encourage you to share it with them.
- **Read Chapters 4 and 5** - they'll get you familiar with using the controls and reading the meters.
- **Read Chapter 9, Processing for FM,** for a full explanation of the processing controls if you really want to customize your sound. This is a long chapter with detailed explanations of the various menus and controls. Once you understand the FM section, you will have no trouble with the HD and Streaming sections as they operate in a nearly identical fashion.
- **Glance through Chapter 18, the System menu,** or just poke around the System menu on the front panel just to get an idea of what's there. These tend to be high-level, global, set-and-forget items.

Chapter 1
The Omnia.9 Story

“Once upon a time...”

The Omnia.9 Story

How Omnia.9 Came to Be

As of the release of this software version and its associated documentation, Omnia.9 has been on the air for almost two years on hundreds of radio stations around the globe. But the story of how Omnia.9 actually began though goes back much further, to a time when its creator and designer Leif Claesson got tired of listening to classic rock music.

There was a lot of good current music out but he couldn't stand the way CD mastering was falling victim to its own "loudness war" reminiscent of the one still being waged by many major market FM radio stations. The CDs themselves were over-processed, hyper-compressed, and clipped to death, and while some people with good ears and common sense are finally starting to pay attention to quality again, the sad fact is that the problem got significantly worse long before anyone took action. And so he found himself listening only to older recordings.

Growing tired of his relatively small playlist, he decided to do something about it, and the idea for "Undo" was born.

Processing for FM, HD, Studio, and Streaming Audio

Each processing core of Omnia.9 contains an Input AGC, a 6-band fully parametric equalizer, multiband noise reduction via downward expanders, a multiband stereo enhancer, a wideband AGC, a second (defeatable) wideband AGC, up to 7 bands of multiband AGC and peak limiting, and an adjustable bass clipper.

The FM core features a final psychoacoustically-controlled distortion masking clipper that not only allows you to be louder on the dial (if that's your goal) but far cleaner, too. It can also be equipped with built-in RDS injection in the composite to ensure perfect integration of RDS, pilot, and audio. The optional HD, Studio, and Streaming cores utilize a look-ahead final limiter for peak control.

There are no hidden or "back door" controls in Omnia.9. We've given you full access to all of its controls so as not to limit your ability to create exactly the sound you want on the air – and as you will soon discover – there is no shortage of controls.

The Omnia.9 Toolbox

Omnia.9 is unique in that it provides you with some built-in tools that we believe are essential to have when setting up your processing. In the past, tuning a processor was done purely by ear in most cases. And while processing is certainly a subjective process – it's as much art as it is science – having the right tools in your toolbox can be very handy (not to mention revealing) when you want to find out why something sounds the way it does.

For that reason, we've chosen to include a built-in oscilloscope, an RTA, and an FFT spectrum analyzer that can monitor dozens of different points within each of Omnia.9's processing cores. There's even a pink noise generator and a powerful parametric equalizer so that you can calibrate your speakers, giving you an accurate monitoring point from which to adjust your processing. Learning to use these tools to your advantage is just as important as learning how to use Omnia.9's controls, because with them, you can see what you are hearing and make informed and intelligent adjustments to your audio that were heretofore difficult if not impossible to make.

That's A Lot of Power…

If it sounds like there's a lot to Omnia.9, well, there is. Chances are Omnia.9 is unlike any processor you've ever used. Giving you full access to all of its controls is like giving you the keys to an exotic sports car. If you know what you're doing, you're in for quite a ride! And if you don't, well, let's just say there are lots of ways to get yourself loose in the corners and end up in the weeds. But for all of its capabilities, Omnia.9 is not difficult to set up and use. We've given you some great presets, created and tuned by people who know Omnia.9 best, that will either satisfy your on-air processing goals right out of the box or will get you close enough to your desired sound so that you can make some tweaks to suit your individual needs and tastes for your format in your market.

That said, we highly recommend that you set aside some time up front to understand the various design philosophies and controls that make Omnia.9 so unique, versatile, and powerful. The time you spend now will pay off exponentially when your on-air sound becomes louder and cleaner than you ever thought possible.

Once you've learned your way around Omnia.9 and rid yourself of the hassle of trying to keep up with separate processing for your HD channels and audio encoding computers, you'll have plenty of time to take phone calls from the program directors and engineers of the other stations in town who have been spending their time trying to figure out why your FM radio station not only sounds bigger on the dial than theirs, but why your music sounds better than it does on the CD.

How long you want to keep them guessing is entirely up to you!

Chapter 2
Quick Startup Guide

In a hurry to get your Omnia.9 on the air?
We understand.

Here are the down-and-dirty bare-essentials to get you up and running in a jiffy.

Quick Start Setup Guide

We know that you're probably in a hurry to get your new Omnia.9 installed and on the air. If you have technical expertise and previous knowledge of audio processor fundamentals, this Quick-Start Setup Guide will get you up and running as quickly as possible.

It is important to remember that because Omnia.9 can be configured in many different ways, not all features and capabilities referenced in this guide or in the full product manual may be available in your particular unit. Therefore, some screenshots may differ slightly in appearance.

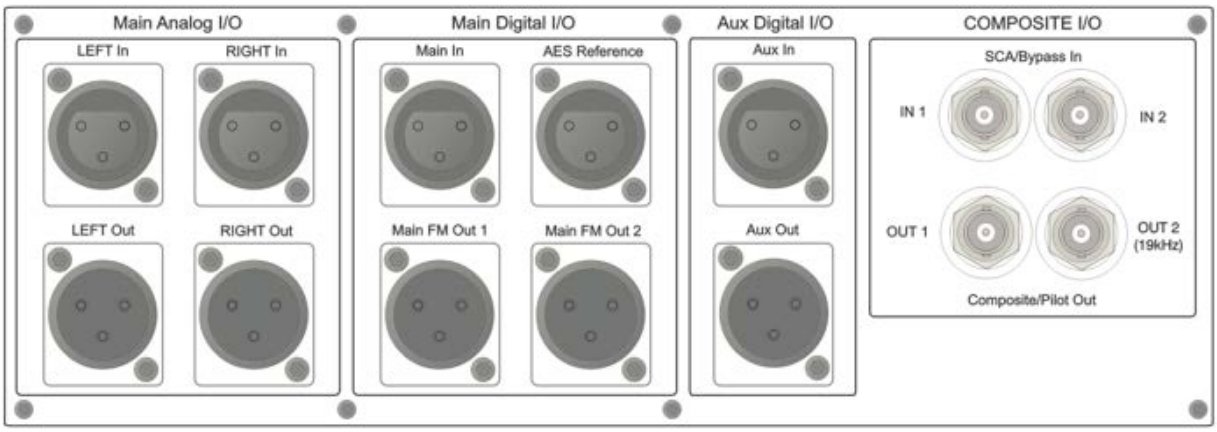
We suggest having an assistant on hand when racking up Omnia.9 to help balance the unit during installation, and strongly recommend using all 4 rack screws for the best support. Although Omnia.9 is fan cooled, leaving an empty rack space directly above and below the unit is advisable.

Physical Installation and Initial Configuration

Connect AC power to both of the internal power supplies. There is no power switch. Failure to use both power supplies is interpreted by the unit as a failure in one of the supplies and will result in an audible alarm which can be silenced by pressing the small red button between the supplies.

It is always possible for a supply to fail and so having redundant supplies does help protect you against losing power altogether in that event. However, it is far more likely that the unit will lose power because of an interruption in the circuit feeding the unit. Therefore, good engineering practice dictates that each supply should be fed from different sources. At minimum, we recommend that both should be a good quality UPS with adequate surge protection. Ideally, each would be fed from a completely different circuit for maximum redundancy.

Next, connect the audio inputs as appropriate for your installation. Omnia.9 accepts balanced professional line-level analog audio via its Left and Right Inputs in the Main Analog I/O section of the rear panel, or AES/EBU digital audio on standard XLR connectors via its Main and AES Reference Inputs in the Main Digital I/O section of the rear panel and Aux Digital Input in the Aux Digital I/O section.



A Word about AES Reference and Sample Rates: *If you need to sync the Omnia.9 to an external reference, use the AES Reference Input to ensure that the externally generated reference will be used as the main clock for the Omnia.9.*

However, Omnia.9's main sample rate MUST be set to match the rate of the external reference at either 44.1 or 48kHz. These settings are found in the System Configuration portion of the System menu. For HD Radio, a sample rate of 44.1kHz is required. For DAB radio, a sample rate of 48kHz is required.

Sample rate converters are present on both the Main Digital In and Aux Digital In connections, and accept any AES signal from 32 – 192kHz.

From the Omnia.9 Home screen, select System, then I/O Options, then Input 1, 2 or 3. Each of Omnia.9's three configurable internal inputs can be fed from any of the physical rear-panel inputs by using the drop-down menus for each Input Source as appropriate for your installation.

In turn, each processing core is fed from one of the three internal input sources. The FM, HD-1, and Stream 1 cores are fed from Input 1. HD-2 and Stream 2 are fed from Input 2, while HD-3 and Stream 3 are fed from Input 3. The Studio core is fed from Input 1 by default but can be assigned its own separate input.

Connect the audio outputs as appropriate for your installation. Omnia.9 supports balanced professional line-level analog audio outputs via its Left and Right Outputs in the Main Analog I/O section of the rear panel, two AES/EBU digital outputs on standard XLR connectors in the Main Digital I/O section, an additional digital output in the Aux Digital I/O section, and two composite MPX outputs in the Composite I/O section.

Return to the I/O Options menu, then select Main Outputs. Drop-down menus are provided to assign the outputs and set the levels of the Main FM Out 1, Main FM Out 2, Aux Out, and Analog Out jacks on the rear panel. Output audio choices include FM Pre-emphasized L/R, FM De-emphasized L/R, HD-1, HD-2, HD-3, Headphone Out, and Speaker Out.

A complete explanation of these controls can be found in the System Menu section of the Home Menu.

- ***Note:*** *FM De-emphasized L/R is the least-recommended output option, especially for analog. Although is it possible in theory to have excellent peak modulation control even with external pre-emphasis, in practice not every stereo generator does pre-emphasis correctly. Certain stereo generators use phase-linear pre-emphasis in DSP, which is incorrect and causes roughly 20% overshoot (2dB loudness loss) when used with any audio processor. We recommend connecting the output of your stereo generator to one of Omnia.9's composite inputs, watching the Left De-mod waveform on the oscilloscope, and comparing it to L/R Output - Left Pre-emph. If you see high frequency peak overshoots, the stereo generator is faulty by design, and must either be replaced or have its pre-emphasis disabled, with Omnia.9's output set to FM Pre-emphasized.*

Omnia.9 is set up by default to provide a pre-emphasized MPX signal from the FM processing core. If you must use an external stereo generator, some additional configuration is required.

From the Home menu, go to System, then System Configuration, then Processing Cores. Choose "MPX" if you only need the composite output of the stereo generator and have no need for pre-emphasized L/R audio. Choose "L/R" if you are you do not intend to use Omnia.9's built-in stereo generator at all. Chose "MPX + L/R" if you plan to use the built-in stereo generator for your main output, but need an additional pre-emphasized L/R output to feed a secondary chain. Select "Apply Configuration" to put the changes in effect. This will cause the Omnia.9 to reinitialize, which will take your station off the air for a few seconds.

From the Home menu, go to System, then I/O Options, then FM Options to select the Output Mode. Output levels and bandwidth can also be adjusted here.

The FM diversity delay can be set by going to System, then I/O Options, then Diversity Delay.

- ***Note:*** *Feeding the transmitter with L/R pre-emphasized output instead of the MPX output has several inherent performance disadvantages, including the loss of peaks beyond 91% (leaving room for the 19kHz pilot tone, as we will not know its phase) - a capability unique to the MPX clipper. RDS and Auto Pilot also become unavailable, though the L/R clipper does employ psychoacoustic distortion masking.*

From the Home menu, go to System, then I/O Options, then Source Adjustment. Use the Input Gain sliders to set the input levels. When driving the input with typical program material at normal operating levels, adjust the Input Gain while watching the Input meters in the Processing display window so that average levels keep the meters in the green. If the meters flash red, the input is being overdriven and levels to the Omnia.9 must be reduced. If necessary, it is also possible to invert the polarity of either or both channels with the Invert control. The Mode control allows several different channel configuration options.

Return to the Home Menu, select FM, select Processing, then select Load Preset to choose one of the factory presets. "Rustonium" is the default preset and provides a well-balanced sound with competitive loudness, suitable for nearly any format. However, we suggest you audition all of the factory presets to get a feel for each of them.

- ***Note:*** *Omnia.9 contains a relay-bypass feature that allows unprocessed audio to pass directly through the unit to prevent complete loss of audio (dead air) any time the software is not active. This includes when the unit loses power, is in the start-up process, or must re-initialize its software after applying certain user-initiated configuration changes.*

  Normally this is not an issue. However, in certain situations - for example, if you have a CD player connected to the analog inputs and an amplifier or speakers connected to the analog outputs - this means the input and output will be directly connected ***with no attenuation whatsoever,*** *resulting in fried speakers (or eardrums) or an eviction notice following complaints from irritable neighbors.*

  When engaged, the bypass relays hard wire the following inputs to outputs:

  Analog In > Analog Out
  Main Digital In > Main FM Out 1
  Aux Digital In > Aux Out
  MPX In 1 > MPX Out 1
  MPX In 2 > MPX Out 2

Chapter 3
General Processing Advice

Setting your goals and avoiding common pitfalls.

General Processing Advice

Know Your Goals

The first step to successful processing – and this applies to ANY processor, not just Omnia.9 - is defining your goals. Whatever those goals are, Omnia.9 is capable of getting you there.

You may wish to maintain as much quality as possible while increasing loudness somewhat over your existing processor. You might want to create very consistent source-to-source spectral balance and develop a “signature sound” for your station. You may find yourself in a situation where you need to stay competitively loud on the dial at the expense of the best possible sound. Or you may have the luxury of aiming for a more open, cleaner sound that will draw and keep listeners for longer periods of time without having to worry about all-out loudness.

In any case, it is best to start with a goal in mind and work toward it carefully and deliberately.

Tweaking and Fiddling

One big temptation when installing a new processor is fiddling with every available control, and there is no shortage of those in Omnia.9! There’s really no better way to find out what each control does, but experimentation and exploration are probably best done “on the bench” before you put your new acquisition on the air. That way, you’re free to tweak away without having to worry about jeopardizing your on-air sound or being unnecessarily timid about making adjustments because you don’t know what affect they will have.

Another suggestion for getting to know your way around Omnia.9 is to find a factory preset that you like and then go exploring in the various menus to see how that sound was achieved. For example, let’s say you find a preset with a smooth, open sound which matches your general processing goal. As you explore, you might find some controls set as you would expect to deliver that sound, but you may also find some unexpected settings that make more creative use of Omnia.9’s controls. There is much to be learned by studying.

Once you are comfortable with navigating through Omnia.9’s menus and have a good understanding of how its controls operate, you’re ready to take it for a test drive on the air.

Choosing a Preset

Regardless of whether you end up using a supplied preset “as-is” or make adjustments to customize your sound, you must start with one of the factory presets. We recommend you find one that most closely matches your goals and then make any modifications from there as needed.

Most processors use radio format names to try and define their sound but then go on to explain there’s no reason a rock station shouldn’t try out the “Country” preset – which is very true. As a rule, Omnia.9 takes a deliberately different approach and most of its presets don’t give you any hint as to who should use them (or how) in the hopes that you’ll “step out of your box” a bit and explore.

If your Country station sounds great on the air with settings that might mimic an “Urban” preset - with a slamming low end and a nice open mid-range – the last thing we want to do is make you second guess yourself because the preset name doesn’t match.

Making and Saving Changes

Human nature is fickle; the human ear adapts and tires quickly; and Omnia.9 is powerful! With those things in mind, here are some recommended “Do’s” and “Don’ts” when making and saving changes to presets:

- DO resist the temptation to constantly fiddle with every control right after you put Omnia.9 on the air.
- DON’T make hasty, radical changes.
- DON’T make adjustments to too many parameters at once – that makes it difficult to determine which of the adjustments is actually responsible for the changes (for better or worse) you’re hearing on the air.
- DO look to the Band Mix and Parametric EQ sections first to achieve the spectral balance (aka “signature sound”) that you’re looking for. These are powerful adjustments, and a little EQ can go a long way. This is generally “safer” than making adjustments to the target, attack, and release rate controls as it is sometimes difficult to know how the different compression stages interact with one another on all material.
- DO take breaks when adjusting your processing. Ears tire quickly, and if you stay at it too long, you’re almost sure to make changes influenced by fatigue.
- DON’T turn your monitor speakers up too loud when making adjustments. High listening levels cause ears to tire even more quickly and mask both gain riding artifacts and distortion. Most listeners play the radio in the background, and problems tend to be more audible at comfortable listening levels.
- DO make small adjustments, particularly to critical controls like Clipper and Limiter thresholds.
- DO take the time to calibrate a set of high-quality reference monitors (a process described in detail in this manual) so that any changes you make aren’t skewed by colorations of the speakers or room.
- DON’T rush the process. Use the “sleep-on-it” method when you’ve reached a point where you are mostly satisfied with the sound, and then re-evaluate it the next day. If it still sounds good, STOP. If it doesn’t, make a few adjustments and walk away for another day.
- DO use the “Save As” method of naming and saving your custom presets rather than over-writing them. This will allow you to return to any point in your adjustments if you get too far “off track” and keep you from having to remember (or guess) what changes you’ve made along the way.

Many Omnia.9 users have asked if they can make their own custom presets “from scratch.” All custom presets start life as a factory preset, but the most straightforward, neutral-sounding factory preset is “Reference Settings,” and as such provides the closest thing to a “blank canvas” possible for building your own preset from the ground up.

Chapter 4
Home Screen & User Interface

Getting touchy-feely with the GUI and learning your way around the front panel display.

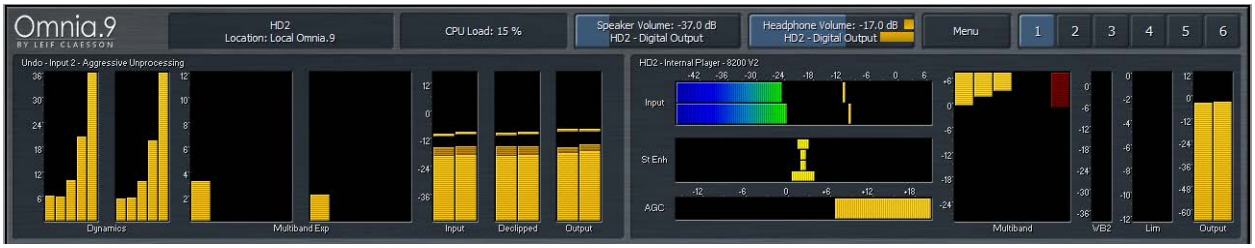
Home Screen & User Interface

At the Top of Every Screen

The Menu Bar at the top of the Home Screen shows the current processing core being viewed, the location of the particular Omnia.9 (user-customized), the CPU load, a Speaker Volume control, a Headphone Volume control, a Menu button, and 6 display preset buttons.

- ***WARNING:*** *Operating additional HD or Streaming processing cores, encoding multiple streams, connecting multiple remotes, and using more display windows at one time places additional demands on the CPU, so as you employ more of these features, it's good practice to take note of the CPU usage. When CPU usage reaches 65%, the indicator turns yellow alerting you that you have reached a practical safe maximum. At 75%, the indicator turns red to provide a warning that reduced system performance, including interruptions to program audio, is possible.*

Omnia.9's front panel touch screen simultaneously provides access to the user interface and displays a wealth of information about your processing and signal.



Controls such as the Speaker and Headphone Volume levels can be adjusted via the touchscreen by placing your finger on the control and sliding left or right. You may continue to drag outside of the boundaries of the slider. Double-tapping on a sliding control will bring up an enlarged view for easier adjustment. Tapping on a button such as the Menu control opens up drop-down menus or navigates to a sub-menu.

- The **Speaker Volume** control adjusts the output level of whatever audio you have routed to the Speaker Output. Likewise, the **Headphone Volume** control adjusts the output level of the audio you have routed to the Headphone Output. Each control displays the patch point currently being monitored. Orange bars within the controls indicate that the limiters in the corresponding monitor output are active. Details of the Speaker Output and Headphone Output are described in the Monitor Outputs section of this manual.

- The **Menu** button on the front panel has four options: Displays Only, Lock Front Panel, Expert Mode, and Reinitialize ("Re-init") Display.

  - Selecting **Displays Only** allows whichever displays you have selected to occupy the entire front panel while hiding the controls, useful when you want a more detailed view of the processing meters or an oscilloscope or FFT display. Tapping anywhere on the screen returns you to the normal view, which shows both displays and controls.

  - The **Lock Front Panel** option allows you to lock the front panel if you have enabled password protection. When you lock the screen, all of the display windows will remain visible in the top

portion of the display and the bottom portion will change to accept your password via the on-screen keyboard. Depending upon how you have re-sized the various portions of the screen, the displays may appear smaller when the unit is locked to ensure sufficient space is reserved for the on-screen keyboard.

- The **Expert Mode** control toggles between Expert and Non-Expert views and is explained in more detail below in the “Navigation Modes” section.

- The **Re-init Display** control will reset the front panel display. In normal operation it is highly unlikely that you would ever need to do so unless otherwise instructed by our support team when diagnosing an issue related to the display.

- The **Display Preset** buttons, numbered 1 – 6, let you create and save six separate Home screens. For example, you may wish to devote one display preset to nothing but the Undo and Processing Meters to display these parameters in greater detail. Or, you could devote an entire display preset to the oscilloscope and monitor the program input, the output of Undo, the MPX before the clipper, and the final MPX output to see what the various stages within Omnia.9 are doing to the audio signal.

Understanding the User Interface and Display

Omnia.9’s User Interface (UI) is set up in “tiers”.

The first tier always contains the highest level (most general) menu options in the form of buttons. When selected, these buttons take you to a second tier of menu options, which are also buttons, but of a more specific nature. The third tier is made up of Omnia.9’s controls.

Navigation Modes

There are two navigation modes: **Expert** and **Non-expert**. The default mode is “Non-Expert.” Both modes give you access to the same number of controls; the terms refer only to the way those controls are displayed and laid out.

The **Non-Expert** mode shows fewer controls at once and has a cleaner, less cluttered look, especially on the front panel display. However, it requires more steps to navigate through the menu system.

The **Expert** mode shows all tiers and available controls for selected menu sections at once. This provides more direct access to items located deeper in the menu structure but may be visually more intimidating to inexperienced users. It works especially well when connected via remote control where you have more screen real estate to work with.

Non-Expert Navigation Mode

By default, Omnia.9 powers up in the Non-expert navigation mode.

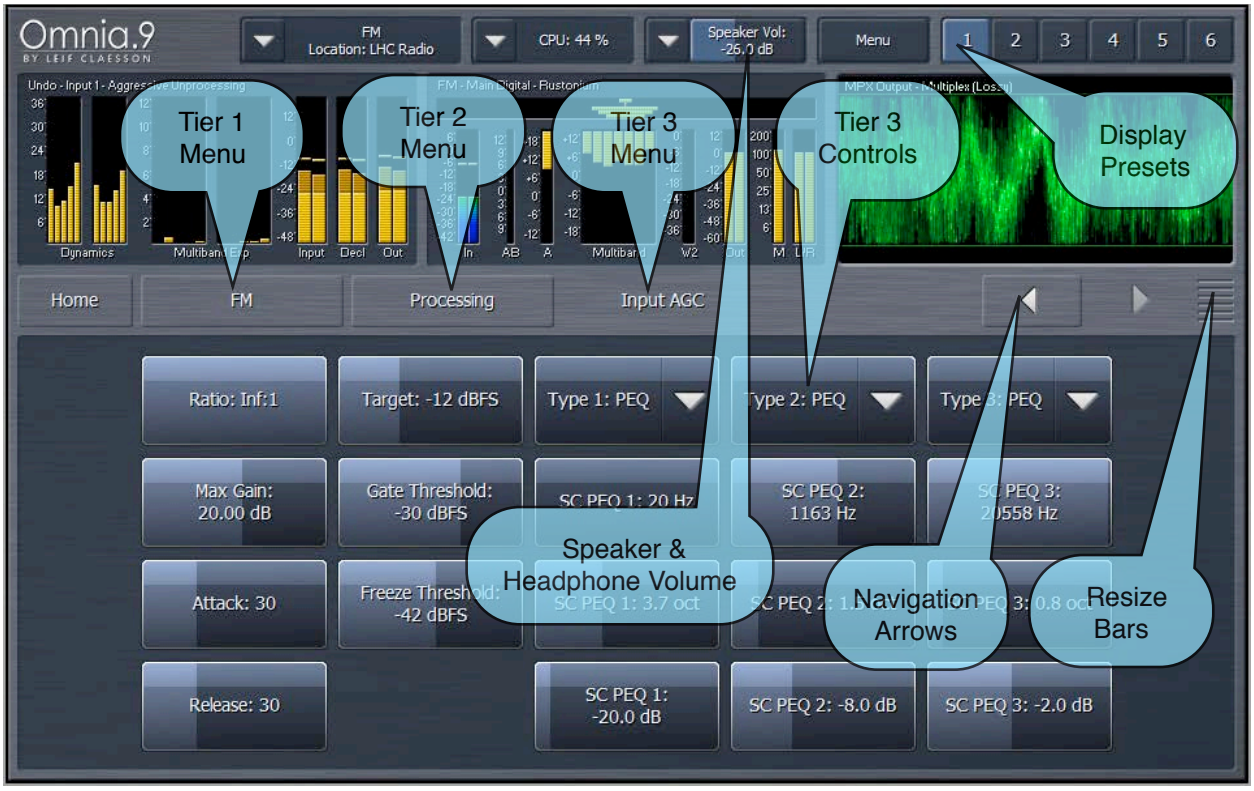
In this mode:

- The top portion of the screen is devoted to the display windows.

- The bottom portion of the screen shows the buttons or controls for the current tier.

- In between these two areas is a navigation bar that shows you exactly where you “are” within Omnia.9, along with navigation arrow buttons that let you go forward or backward to most places you have visited in the fourth tier.

- Selecting and holding down either of the arrow buttons will bring up a list of these places so you can re-visit them directly.
- Double-tapping on any of the controls brings up a magnified view that has two large sliders – one for a “course” adjustment and one for a “fine” adjustment. Once you’ve made your adjustments, tap “Done” to return to the previous display of all the controls for the tier you’re in.
- You can make individual portions of the window larger or smaller to devote more or less on-screen real estate to display windows or control windows by dragging up and down on the re-size bars.



Expert Navigation Mode

Clicking on the Menu button and selecting “Expert Mode” allows more direct control by displaying more information at once.

In this mode:

- The navigation bar and arrows are eliminated.
- The top portion of the screen is devoted to the display windows.
- The middle portion of the screen shows the first, second, and third tier buttons.
- The bottom portion of the screen shows the third tier controls.
- You can make individual portions of the window larger or smaller to devote more or less on-screen real estate to display windows or control windows by dragging up and down on the re-size bars.

The Three Basic Control Types

There are three basic types of controls in Omnia.9:

- **On/Off buttons** - These controls toggle on and off, thereby enabling or disabling the associated function.
- **Drop-down menus** provide a drop-down list of options. Scrolling over each option highlights it, while a tap or left-click on a mouse selects it.
- **Sliding controls** - Selecting a slider control highlights it. Tapping and holding (or left-clicking and holding with a mouse) a slider allows you to drag it back and forth to adjust its parameter. When using a touch interface, dragging the slider faster will accelerate the rate of change. As long as you haven't lifted your finger (or released the left mouse button) you can continue to drag the slider beyond the edge of the control all the way out to the very edge of the display. Because it is often difficult to make fine adjustments on a small screen, when using a touch interface you can double-tap a slider to bring up a pop-up window with two large sliders, one for "coarse" adjustment and one for "fine."

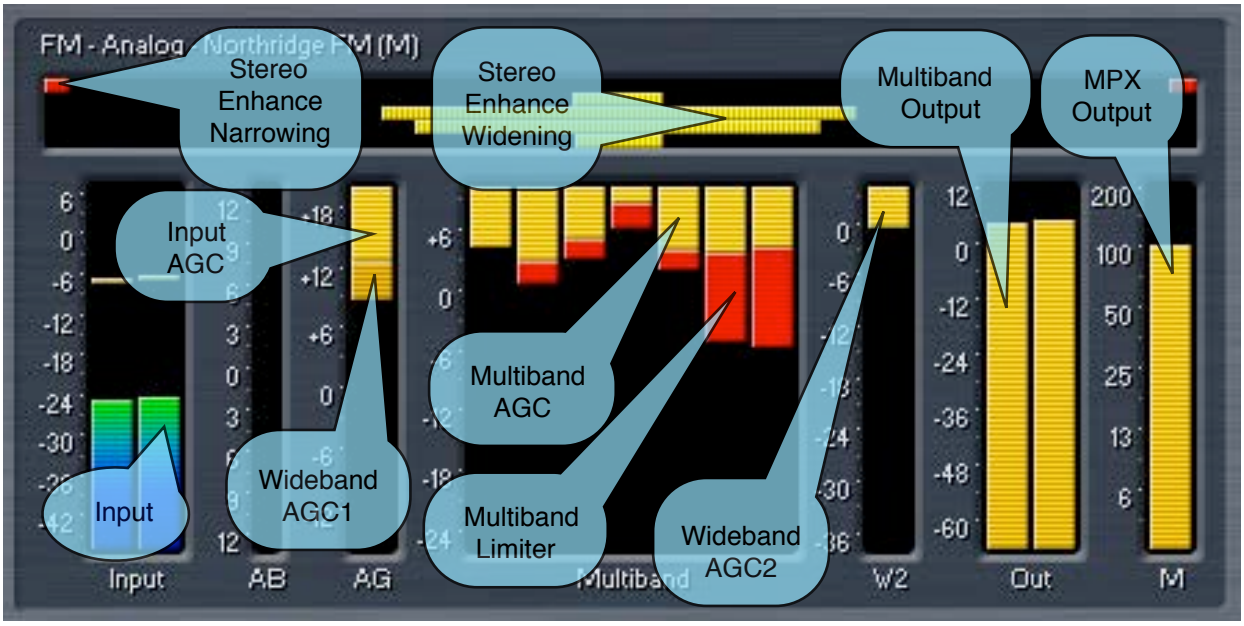
Chapter 5
Reading the Processing Meters

A meter is worth a thousand words, or how to connect what you see to what you hear.

Reading the Processing Meters

Understanding the Processing Meters Display

The Processing Meters Display provides a tremendous amount of information about what's going on inside each of Omnia.9's processing cores, but in a very efficient and easy-to-read manner.



In the FM processing core, meters are provided for monitoring input levels, Input AGC, Wideband AGC1, Multiband AGC and Limiters, Multiband Noise Reduction, Multiband Stereo Enhancement, Wideband AGC2 and AGC3 sections, post-multiband output, MPX output, and individual left and right outputs. In the HD and Streaming cores, meters for the final look-ahead peak limiters and the final output of the processing core are added, while the MPX output and left and AGC output meters are eliminated.

- The **ITU BS.1770 Input** meters indicate the level of the unprocessed source audio coming into Omnia.9 with floating peak indicators above each bar.
- The **Auto Balance** window indicates any corrective left-to-right channel balancing being performed.
- The **AGC** meter window shows the levels and action of the Input AGC and the Wideband AGC1 compressors. It also shows the level of the Wideband AGC2 section when it is enabled and positioned before the multiband section.

  Depending upon the settings of the various Input and Wideband AGC1/AGC2 controls, the scale to the left of the meter can display levels below threshold (positive numbers) as well as levels above threshold (negative numbers). When the meters dip down below "0" the compressors are above threshold and therefore in a state of gain reduction. When they rise above "0" they are below threshold and in a state of gain increase. The combination of Input AGC, AGC1, and AGC2 gain is added together to determine the total amount of AGC gain in place.

- The **Input AGC** levels are indicated by a bright yellow bar. The Wideband AGC1 levels are shown as a dark orange bar extending below the Input AGC meter. Wideband AGC2 levels (if this compressor is situated before the multiband section) are shown as a second, darker orange bar below the AGC1 meter.

- The **Multiband** meter window shows the levels and action of the AGC, limiter, and noise reduction sections for each band (ranging from 2 to 7 depending upon the preset employed). As is the case with the AGC metering section, the scale will change based upon the settings of various multiband controls.

- The **AGC** level in each band is indicated by a bright yellow bar. The multiband limiter for each band is represented by a bright red bar that flashes beneath the AGC level. The multiband noise reduction for each band is shown by a dark red bar that appears to drop down from the very top of the meter. Gating - the condition in which release is significantly slowed down - is indicated by a dark red ribbon at the bottom of the multiband AGC meters. Freezing - the condition in which release stops completely - is indicated by the same red ribbon, but slightly brighter. Dry voice detection is indicated by a green ribbon in the same location.

- If the **Wideband AGC2** compressor is enabled and placed after the multiband section, or it is used in one of its Bass modes, its meter will be displayed separately to the right of the multiband display. The Wideband AGC3 meter will appear after the multiband section as well if it has been enabled.

- The **Multiband Output** meters show the levels after the multiband processing section, but before the Bass Clipper and Final Clipper.

- The **MPX** meter shows the final output of Omnia.9's FM processing core, including L+R, L-R, and pilot, plus RDS when enabled.

- The **L/R** meters show the output of the L/R clipper, which is useful only if you are using the Analog or Digital FM L/R outputs.

- The **Multiband Stereo Enhancer** meters will be displayed if the current preset employs this feature.

  Yellow bars extending from the middle outward toward the left and right of the display indicate a widening of the stereo image.

  Red bars extending from the left and right edges toward the middle indicate a narrowing of the stereo image.

Chapter 6
The Home Menu

“There’s no place like home” - Dorothy.

The Home Menu

Omnia.9's **Home Menu** is the highest level menu available in the user interface. From here, you can configure and route Input source audio, access the Undo menus and controls, access the controls of the various processing cores, configure the Monitor Outputs, and access system settings.

If you ever lose your way in the menu system, going back to the Home Menu will get you quickly back on familiar ground.

Chapter 7

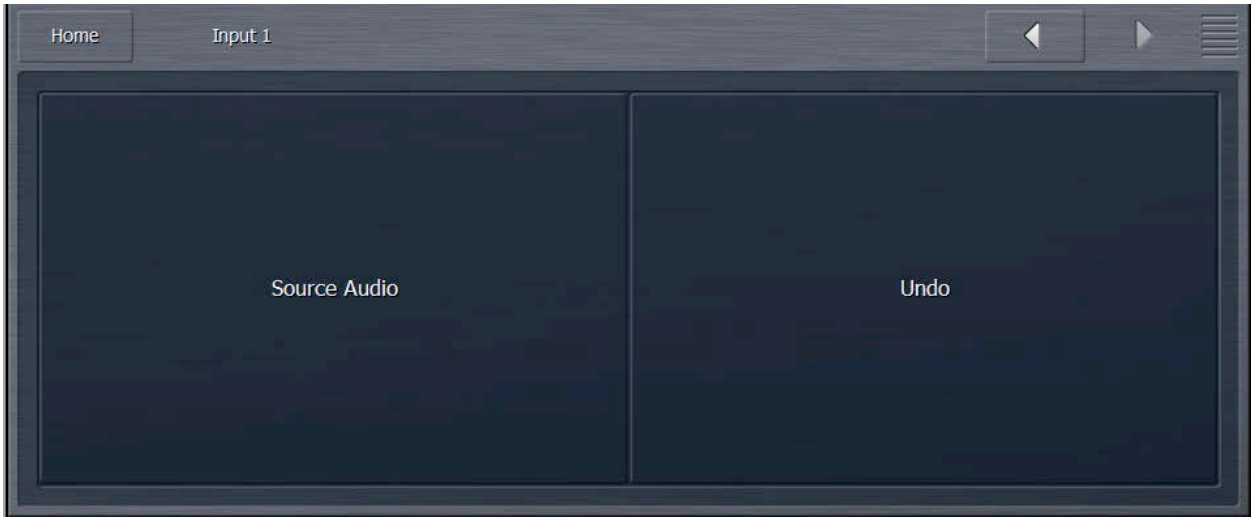
Inputs 1/2/3
Source Audio Menu

“The only source of knowledge is experience.” - Albert Einstein

“The only source of audio are those jacks on the back. And the internal player.” - Omnia.9 Manual

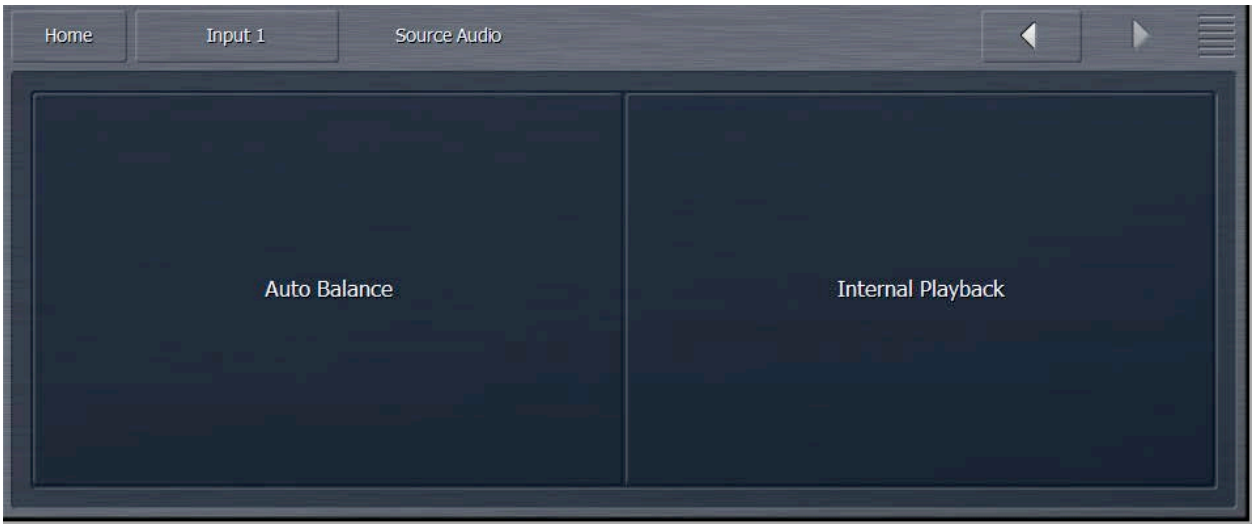
Source Audio Menu - Inputs 1/2/3

Each of the inputs has its own **Source Audio Menu** and **Undo Menu**. Input 1 is always used for FM/HD-1/Streaming 1. On units so equipped, Input 2 feeds the HD-2/Streaming 2 path while Input 3 feeds the HD-3/Streaming 3 path. The menus and controls are identical for each.



Source Audio Menu

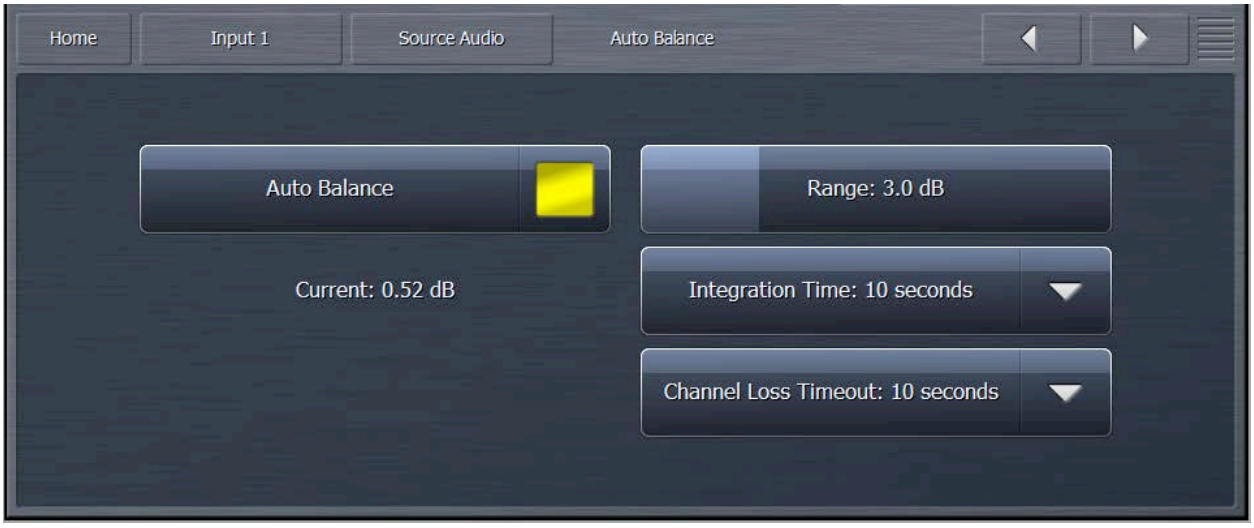
The Source Audio Menu provides access to the Auto Balance and Internal Playback sub-menus.



Auto Balance Menu

When **Auto Balance** is enabled, Omnia.9 will automatically balance the left and right channels of the incoming audio, compensating for any level discrepancies that may be present in an audio stage preceding the processor (such as the output of a console or an STL). To monitor input audio before Auto

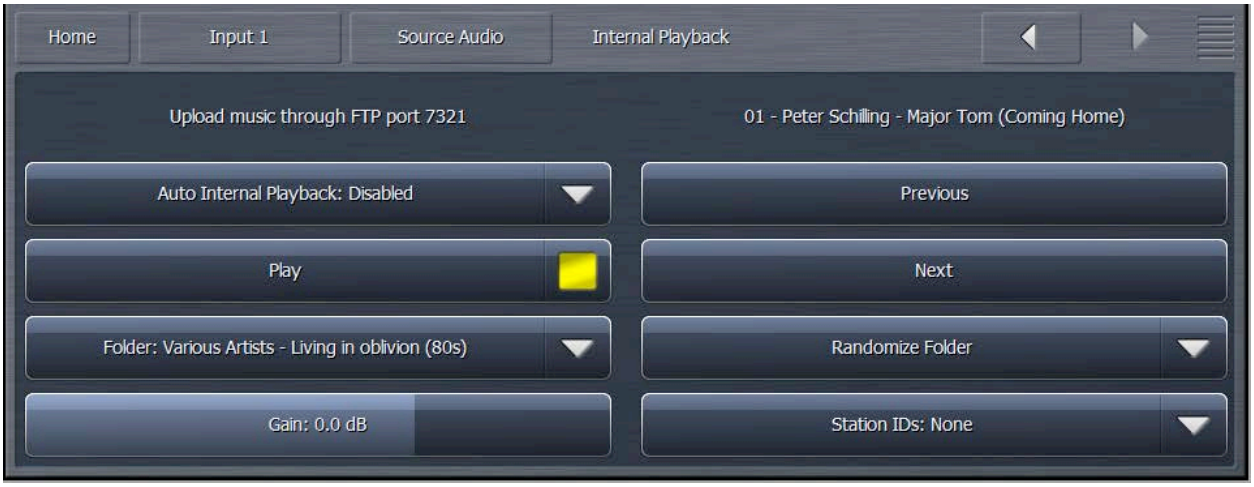
Balance, be sure to monitor at the Program Input patch point. To monitor audio immediately after Auto Balance, choose the Pre-Declipper patch point.



- Selecting the **Enable** button toggles Auto Balance on and off.
- The **Range** slider sets the maximum total amount of gain that can be increased or decreased in each channel. For example, with the Range control set at 6.0dB, the gain in each channel can be boosted by up to 3dB and attenuated by up to 3dB. Each channel contains an ITU BS-1770 loudness monitor which measures and compares the frequency-shaped RMS level in each channel.
- The **Integration Time** control determines how quickly Auto Balance corrects any discrepancies between the left and right channel. Shorter integration times correct channel-to-channel imbalances more quickly and provide more consistent levels between the left and right channels. Reducing the integration time too much may cause an undesirable or unnatural effect as the channels re-balance, and therefore the default setting of 10 seconds is recommended for most situations.
- The **Channel Loss Timeout** option automatically fades to mono if one input channel is missing. The length of time Omnia.9 waits before fading to mono can be set to 3, 10, 30, or 60 seconds. 10 seconds is the default. This feature can be disabled altogether by selecting “Off”.

Internal Playback Menu

Omnia.9 provides the ability to play audio files you provide from within the unit itself for each input.



- Selecting the **Internal Playback** button will start audio playback from Omnia.9's internal library of songs.

- ***WARNING:*** *This will interrupt the program audio being fed to the selected input!*

The internal player is not an automation system, but it can randomize music and guarantees not to repeat a song within twenty songs (provided you have more than 20 songs in the folder). Beyond its value as a temporary backup source, the internal player is also handy if you are doing work in the studio and need to temporarily interrupt the normal audio input path. Or, provided Omnia.9 is located at the transmitter site, it can also play out music if you need to work on the STL.

The internal player will not crossfade, but will automatically cut any silence at the beginning and end of each track and thus provide tight back-to-back playback. Station IDs may be optionally inserted between songs.

Music is uploaded to the internal SSD drive by connecting to Omnia.9's built-in FTP server on port 7321 (passive ports 7322-7331). The default user name is either anonymous or "Omnia". There is no password, as access is controlled by the HTTP Access White List (found in the System > System Configuration > HTTP Access menu).

The internal drive can hold roughly 15GB of music in MP2, MP3, FLAC, or WAV (PCM only) formats. The FTP server will refuse any file that is not a supported type.

Note that although the internal player overrides the program input, you can still hear and see the physical input through any of the Monitor Outputs (including Client Audio on a remote connection) by selecting one of the Physical Input patch points.

Each root folder will be directly available in the Folder drop-down menu and will automatically receive a "Station IDs" folder where you can place station IDs or jingles.

- The **Gain** control sets the output level of the internal audio player.

- The **Previous** and **Next** buttons allow you to play the next or last song, respectively.

- The **Mode Selector** has several options for file playback. File simply plays one cut until it is over and then stops. Folder plays the entire contents of the folder and stops. Repeat File and Repeat Folder allow you to repeat either a single cut or an individual folder respectively.

Chapter 8

Inputs 1/2/3
Undo Menu

Confucius said that when faced with what is right,
leaving it undone shows a lack of courage.

Call us brave.

Undo Menu - Inputs 1/2/3

What Exactly Is Undo?

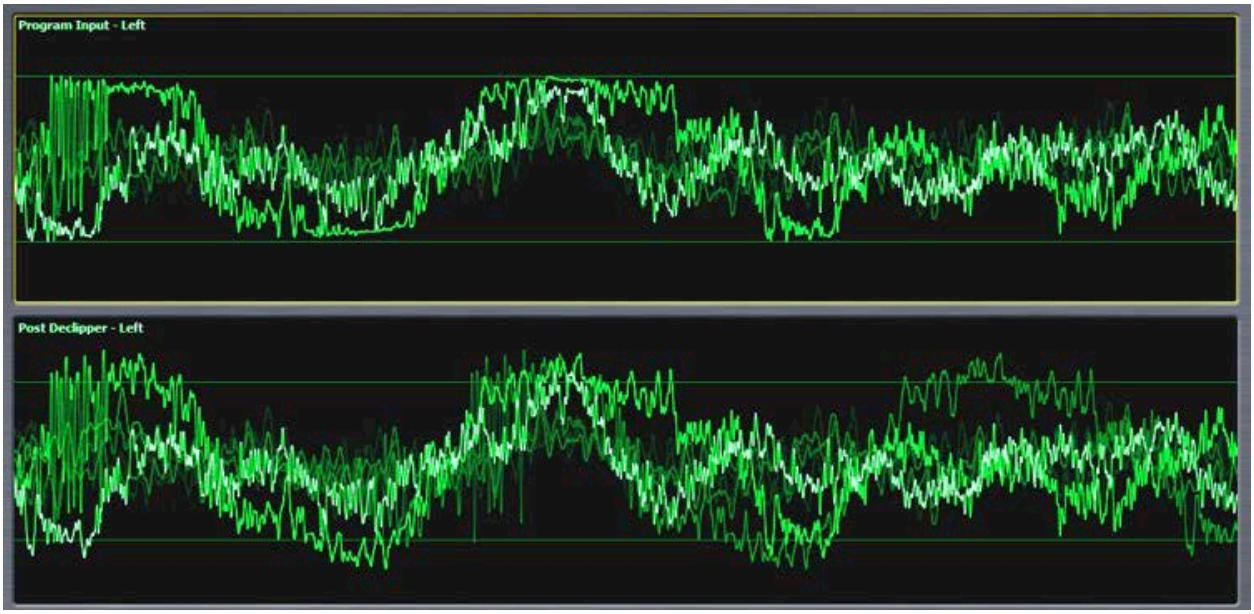
In order to understand how to best use Undo, it is helpful to understand exactly what it is and how it works.

Undo is actually two separate processes - a de-clipper and a multiband expander – which work together to “undo” the poorly mastered, hyper-compressed and clipped audio found on so many modern CD’s.

- ***Note:*** *The de-clipper works most effectively when using Omnia.9’s digital inputs. Regardless of whether your use an analog or digital input, the incoming audio must not be equalized or pre-processed in any way. This means NO leveler, neither wideband nor multiband. If the possibility of clipping the STL at the studio is a concern, simply turn down the input level to the STL and use Omnia.9’s Input Gain control to compensate. Omnia.9 will also happily boost low input levels automatically.*

Take a look at the two waveforms below, captured using Omnia.9’s built-in oscilloscope. The top window shows the damaged source audio. The bottom window shows the same audio after it has passed through the de-clipper. Notice how the peaks that were clipped during mastering have been restored by the de-clipper.

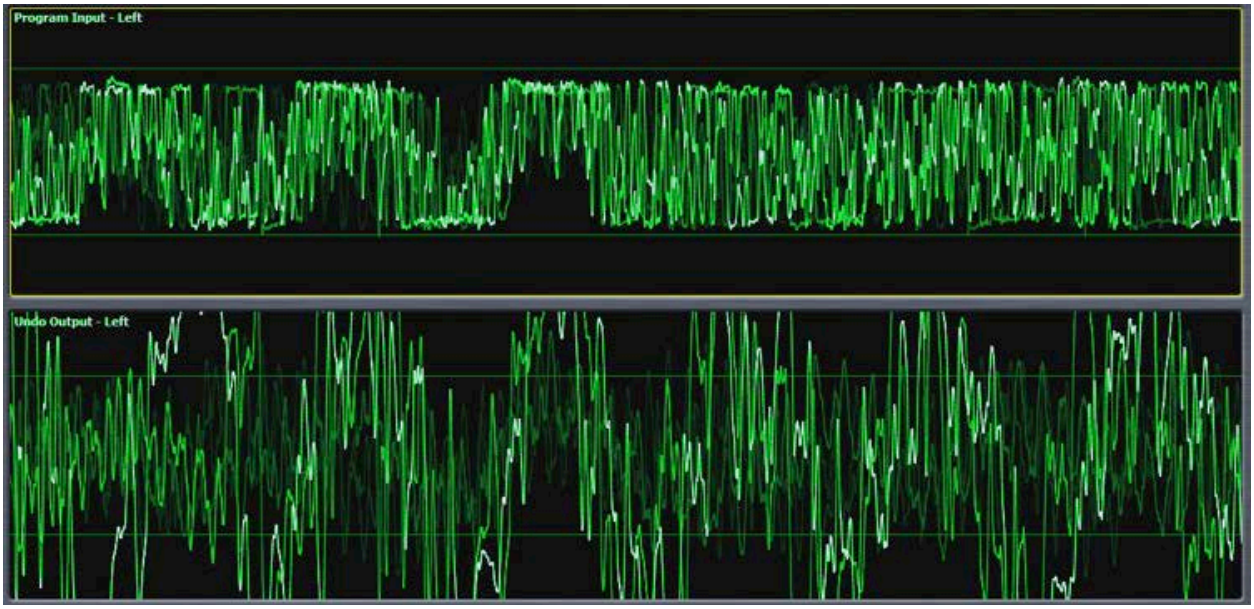
- ***Note:*** *The oscilloscope gain was kept at the same level for comparison purposes, but Omnia.9 has sufficient internal headroom, and the illustrations that follow do not suggest that the audio is being clipped again by any portion of “Undo”).*



The second stage of Undo is a multi-band expander that is designed to restore dynamic range to audio that has been excessively compressed. Each of the five bands of the expander has a corresponding psychoacoustic dynamics detector and a peak detector that examine the peak levels of the incoming

audio, and based upon that information plus the settings of the various controls, tells the expander how much dynamic range to restore to the audio.

The illustrations that follow show the damaged audio before de-clipping or expansion. The bottom window shows the same audio after it has been de-clipped and expanded.



Undo Menu

Each of the three internal audio input paths has a dedicated Undo section.

From the main **Undo** menu, you can load and save Undo presets, protect presets, enable and disable the de-clipper or multiband expander, choose which functions are displayed in the Undo meter window, adjust the amount of de-clipping, adjust the dynamics detector's ratio, weighting, and peak settings, and set the expander's levels, rates, and ratios.

A word of caution about Undo! In keeping with the “spirit” of Omnia.9, we have not blocked access to any of its controls, including those found in the Undo section. And while we would be the last ones to discourage you from making the most of everything Omnia.9 has to offer, we feel that outside of adjusting the level of de-clipping, most users will get the most out of this powerful tool by using one of the provided factory Undo presets. For the more curious and brave, read on!

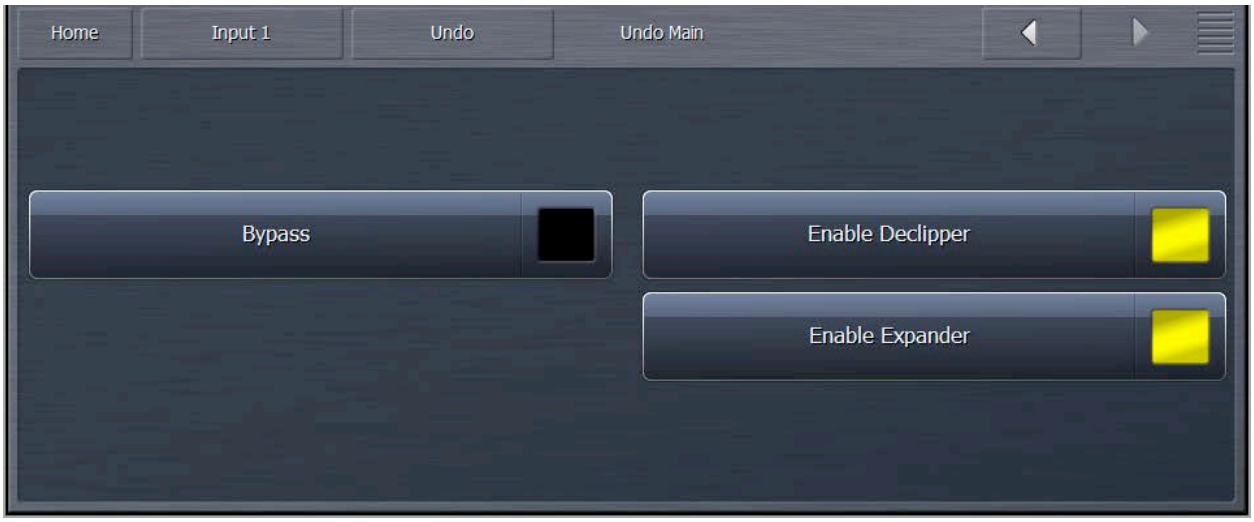
Load Preset, Save Preset, and Preset Protection Menus

The **Load Preset** menus allows you view the Undo preset currently on the air, toggle back and forth between the current and backup presets, load a new preset, compare the settings of two presets, and delete user presets. The **Save Preset** menu allows you to edit the name of or save over a user preset. The **Preset Protection** Menu allows you to password protect a preset so that it cannot be modified or copied for use in another Omnia.9.

A complete explanation of how to use the Load Preset, Save Preset, and Preset Protection functions is found in the section of this manual devoted to FM processing. Keep in mind, however, that while the process for loading and saving presets is identical, *these are two completely independent operations within Omnia.9 with completely different sets of presets.*

Undo Main Menu

The **Undo Main** menu contains the controls to enable and disable Undo.



- When selected, the **Bypass** control turns off both the de-clipper and the expander portions of Undo.
- The **Enable De-clipper** and **Enable Expanders** buttons turn the de-clipper and expander portions of Undo on and off independently, respectively.

Undo Metering Menu

The **Undo Metering** menu determines which of Undo’s four metering functions are displayed in the Undo Meters window. A more comprehensive explanation of how to read and understand the Undo meters is provided later in this section when the various Undo controls are explained.

When enabled, the **Show Dynamics Detector** Meters, **Show Expander Ratio** Meters, **Show Speed Governor** Meters, and **Show Expander Threshold** Meters allow the associated meters for each respective section to be displayed in the Undo Meters window.

De-clipper Menu

The **De-clipper** menu contains a single control to set the level of de-clipping in 5 stages. Lower settings offer more conservative de-clipping action, while higher settings offer more de-clipping.

A setting of Level 5 the “normal” setting and recommended for most modern material which have been mastered with high levels of compression and clipping. If your station primarily plays source material that has been cleanly mastered, you may find lower settings are sufficient.

The most effective way to monitor exactly what the de-clipper is doing is to view the pre-de-clipper and post-de-clipper waveforms side-by-side using Omnia.9’s built-in oscilloscopes. Details of how to configure the display windows and set up the oscilloscopes are provided in the **Display Settings** section of the manual.

Density Detector Band Weighting

Each band of Undo’s expander has a corresponding density detector. The **Density Detector Band Weighting** controls allow you to determine how much control each detector provides its own band as well as any other expander band.

To put this concept into traditional processing terms, it is similar to “band coupling” in a multiband compressor, where all bands may operate completely independently of one another or may influence one another by way of coupling to varying degrees.

The degree to which each dynamics detector band influences and controls each expander band is determined by a 5 x 5 slider matrix. Each column represents a dynamics detector band, while each row represents an expander band.
The default (and recommended) settings are set up so that each expander band controlled almost entirely by its corresponding dynamics detector band, but with some control provided by surrounding dynamics detector bands. Higher values mean a particular dynamics detector band has more influence over a particular expander band, and vice versa.

Please note that in order to provide a means by which to allow one dynamics detector band to provide 100% of the control over a single expander band, every control must be designed to go all the way to 100. When one control is set to 100 and other controls in that band are set to a value higher than 0, thereby causing a sum greater than 100, Undo interprets that information and adjusts the settings of each band to maintain the desired proportion of influence you have set for each band relative to 100.

Dynamics Detector to Ratio Menu

The **Dynamics Detector to Ratio** menu allows you to set time constants of the expansion ratio adjustment as well as the Expansion Start levels and Transition Width levels for each of the 5 bands of Undo’s multiband expander.

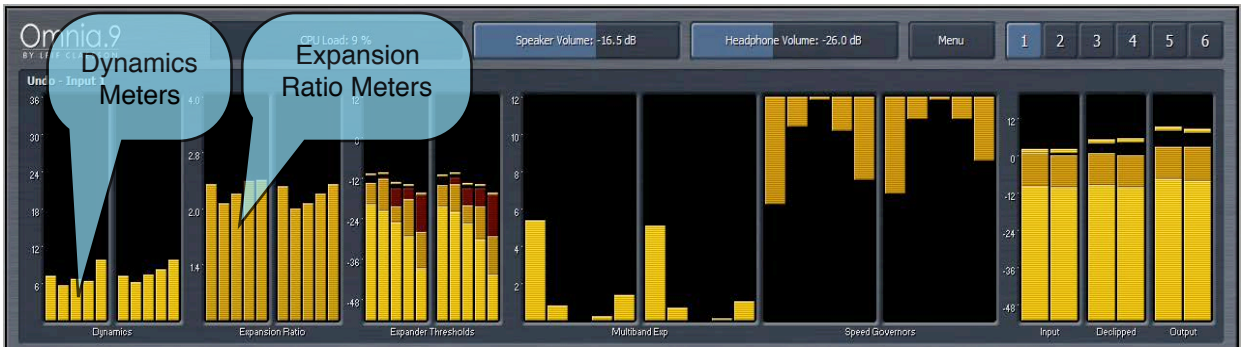
Home
Input 1
Undo
DD to Ratio
B1 Attack: 100
B1 Release: 100
B1 Exp Start (1:1): 20.00 dB
B1 Transition (to 4:1): 14.00 dB
B2 Attack: 100
B2 Release: 100
B2 Exp Start (1:1): 20.00 dB
B2 Transition (to 4:1): 14.00 dB
B3 Attack: 100
B3 Release: 100
B3 Exp Start (1:1): 18.00 dB
B3 Transition (to 4:1): 14.00 dB
B4 Attack: 100
B4 Release: 100
B4 Exp Start (1:1): 20.00 dB
B4 Transition (to 4:1): 13.00 dB
B5 Attack: 100
B5 Release: 100
B5 Exp Start (1:1): 24.00 dB
B5 Transition (to 4:1): 15.00 dB

- The **Attack** and **Release** controls for each band determines how quickly the expansion ratio will track along with the dynamic detector settings. The default (and recommended) setting is 100, which means the expansion ratio will track instantaneously with no additional delay.

- When the dynamics detector falls below a certain level, expansion will begin, starting at a minimum ratio of 1:1 and increasing to a maximum ratio of 4:1. The point at which that expansion begins to occur is set by the **Expansion Start** control in each band.

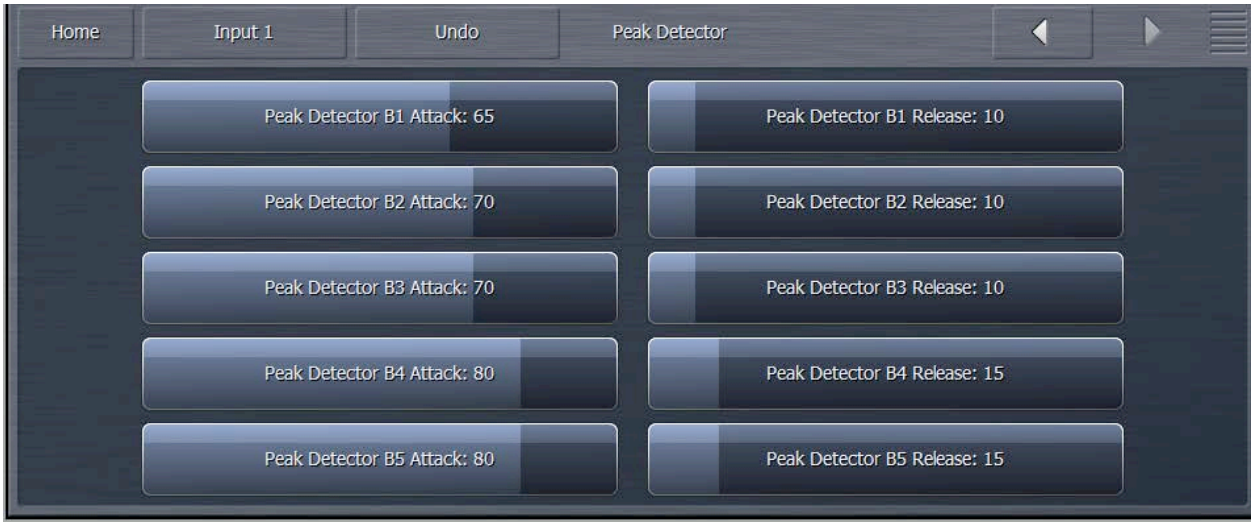
- The relative point at which the expansion reaches its full 4:1 ratio is determined by the setting of the **Transition Width** control in each band.

The detected amount of dynamics in each band is indicated by the **Dynamics** meters. Taller bars indicate more inherent dynamics in the music, while shorter bars indicate less dynamics and are generally the inverse of the **Expansion Ratio** meters. The result of settings in the Dynamics Detector to Ratio menu can be observed on the Expansion Ratio meters in the Undo Meter Window.



Peak Detector Menu

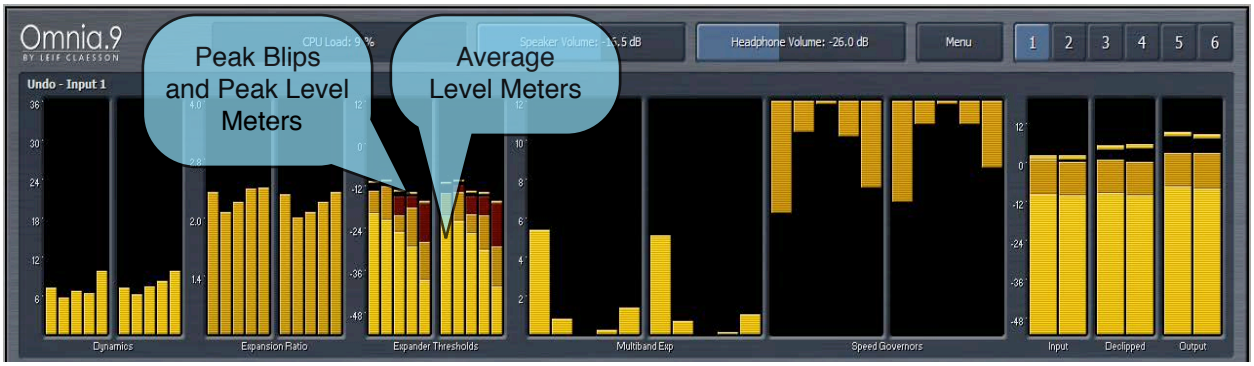
Undo measures audio peaks as a means by which to set the expander thresholds based upon the incoming program audio. The **Peak Detector** Menu controls the attack and release speed of each band of Undo's Peak Detectors.


Home
Input 1
Undo
Peak Detector
Peak Detector B1 Attack: 65
Peak Detector B1 Release: 10
Peak Detector B2 Attack: 70
Peak Detector B2 Release: 10
Peak Detector B3 Attack: 70
Peak Detector B3 Release: 10
Peak Detector B4 Attack: 80
Peak Detector B4 Release: 15
Peak Detector B5 Attack: 80
Peak Detector B5 Release: 15

- The **Attack** speed controls determine how quickly Undo reacts to incoming audio peaks. Faster settings will make Undo more reactive to smaller incoming peaks by raising the threshold. Slower settings will effectively lower the threshold.

- The **Release** speed controls determine how quickly Undo allows the peak values to fall back toward the actual audio levels. Faster times will cause the peak levels to fall more quickly.

The effect of the Peak Detector settings is represented by the peak “blips” at the top of the dark orange peak level bars within the **Expander Threshold** meters in the Undo Meter window. Average levels are indicated by the bright orange bars.



Expander Levels Menu

The **Expander Levels** menu gives you access to the Relative Threshold, Band<Wideband Distance Limit, and Maximum Gain controls of each band of Undo’s expanders.

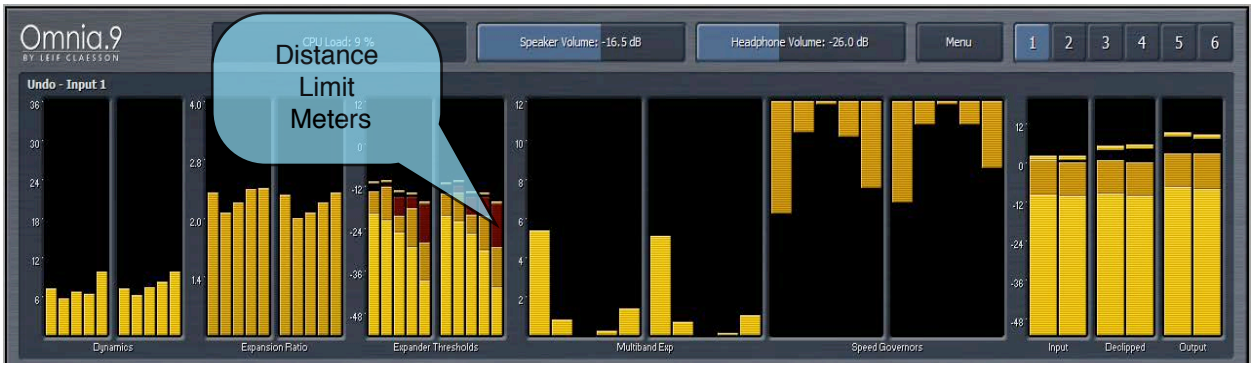
Home
Input 1
Undo
Expander Levels
B1 Relative Threshold: -6.50
B1<WB Distance Limit: 11 dB
B1 Maximum Gain: 6.00 dB
B2 Relative Threshold: -7.50
B2<WB Distance Limit: 7 dB
B2 Maximum Gain: 6.00 dB
B3 Relative Threshold: -8.50
B3<WB Distance Limit: 10 dB
B3 Maximum Gain: 6.00 dB
B4 Relative Threshold: -9.00
B4<WB Distance Limit: 10 dB
B4 Maximum Gain: 6.00 dB
B5 Relative Threshold: -9.00
B5<WB Distance Limit: 12 dB
B5 Maximum Gain: 6.00 dB

- The **Relative Threshold** control for each band determines how far below the currently detected peak the expander threshold sits. Lower thresholds (moving the slider to the right) result in a greater peak-to-threshold distance and therefore provide more expansion. Higher thresholds (moving the slider to the left) narrow the peak-to-threshold distance and provide less expansion.

- In addition to an adjustable per-band peak detector with adjustable attack and release speeds (whose function is described above in the Peak Detector menu section), each channel also has a wideband peak detector with fixed attack and release speeds. The **Band<WB Distance Limit** controls determine the greatest distance by which an individual band's peak detector can fall relative to the wideband level and keeps any one band from being expanded if there are insufficient levels to begin with. For example, if the current wideband peak is -6dB and this control is set to -10dB, the peak detector for that individual band will not fall below -16dB.

- The **Maximum Gain** control sets the absolute maximum amount of gain that can be applied to the audio in each expander band regardless of program material or any other control settings.

The **Distance Limit** is represented by the dark red bars in the **Expander Thresholds** meter in the Undo Meter window.



Expander Rates Menu

The **Expander Rates** menu provides controls for the attack and release speeds of the expanders for each band as well as attack and release speed controls for each band's speed governors.

Home
Input 1
Undo
Expander Rates
B1 Expander Attack: 80
B1 Expander Release: 68
B1 Speed Governor Attack: 20
B1 Speed Governor Release: 30
B2 Expander Attack: 80
B2 Expander Release: 66
B2 Speed Governor Attack: 22
B2 Speed Governor Release: 18
B3 Expander Attack: 80
B3 Expander Release: 65
B3 Speed Governor Attack: 34
B3 Speed Governor Release: 8
B4 Expander Attack: 80
B4 Expander Release: 72
B4 Speed Governor Attack: 35
B4 Speed Governor Release: 7
B5 Expander Attack: 94
B5 Expander Release: 73
B5 Speed Governor Attack: 54
B5 Speed Governor Release: 6

- The **Expander Attack** speed control determines how quickly each band's expander will rise when the audio is in need of expansion. Faster settings will expand the audio more quickly. Using the built-in oscilloscope to view the Undo Control Signal patch point is very helpful for adjusting attack and release speeds as they show the gain that will be applied to the audio in each band. A detailed explanation of how to monitor various patch points within Omnia.9 is provided in the Display Settings menu of this manual.

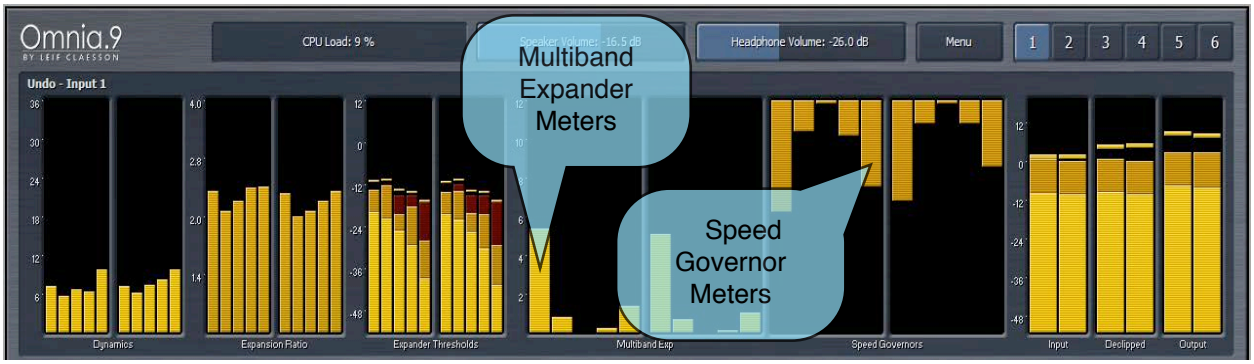
- The **Expander Release** speed control adjusts how quickly the expander levels will fall once the expansion is no longer called for. Faster settings will allow the levels to fall more quickly.

Undo also utilizes a second set of parallel expanders which look at the same input and automatically scale the attack and release characteristics of the main expanders. These Speed Governors detect when the main expanders have been operating at full speed for an extended period of time and will slow down the main expanders.

- The **Governor Attack** speed determines how long the speed governors wait before scaling back the speed of expanders. Faster attack speeds will cause the speed governors to slow down the expanders more quickly.

- The **Governor Release** speed setting determines how quickly the speed governors give up their influence on the main expanders.

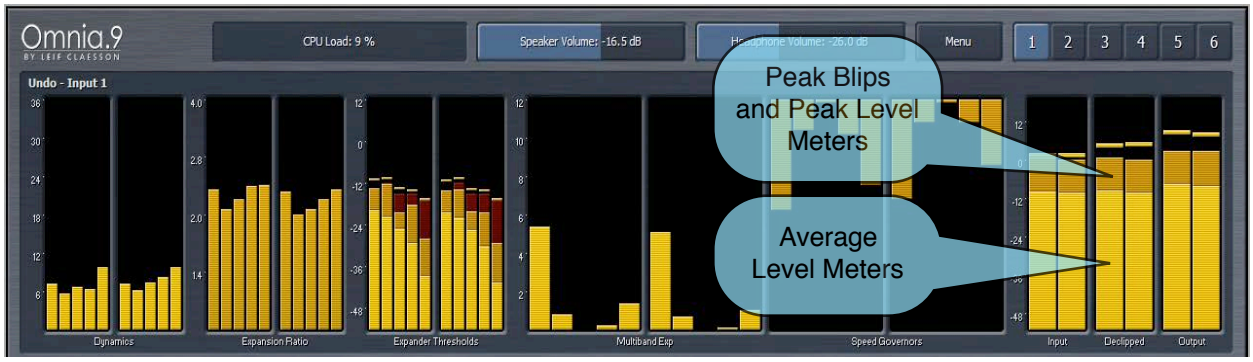
The effect of the expander attack and release speeds are indicated by the **Multiband Expander** meters in the Undo Meter window. The levels of the speed governors are indicated in the **Speed Governors** window.



Expander Ratios Menu

Each Undo expander band can operate in a range of ratios between 1:1 and 4:1. The **Minimum Ratio** and **Maximum Ratio** determine the absolute minimum and maximum ratios, respectively, for each band.

There are three additional meters in the Undo metering window for audio levels at the input to Undo, after the de-clipper but before the multiband expanders, and at the output of Undo following the de-clipper and expanders. In each case, the bright orange bar indicates average levels, the darker orange bars indicate peak levels, and the floating orange blips serve as peak hold indicators.



Chapter 9
FM Menu
Processing for FM

You have to start somewhere.

Here is good.

FM Menu: Processing for FM

You Have to Start Somewhere: The FM Menu

The main FM Menu contains for sub-menus for Processing, MPX Input, RDS, and Meter Options.

While Omnia.9 offers completely separate processing cores for FM, up to three HD channels, three streams (depending upon configuration), and a low latency studio core, the majority of the controls are the same for each. There will be some differences, of course, for settings that are peculiar to a particular medium. (For instance, HD and Streaming outputs use look-ahead limiters instead of a clipper for final peak control).

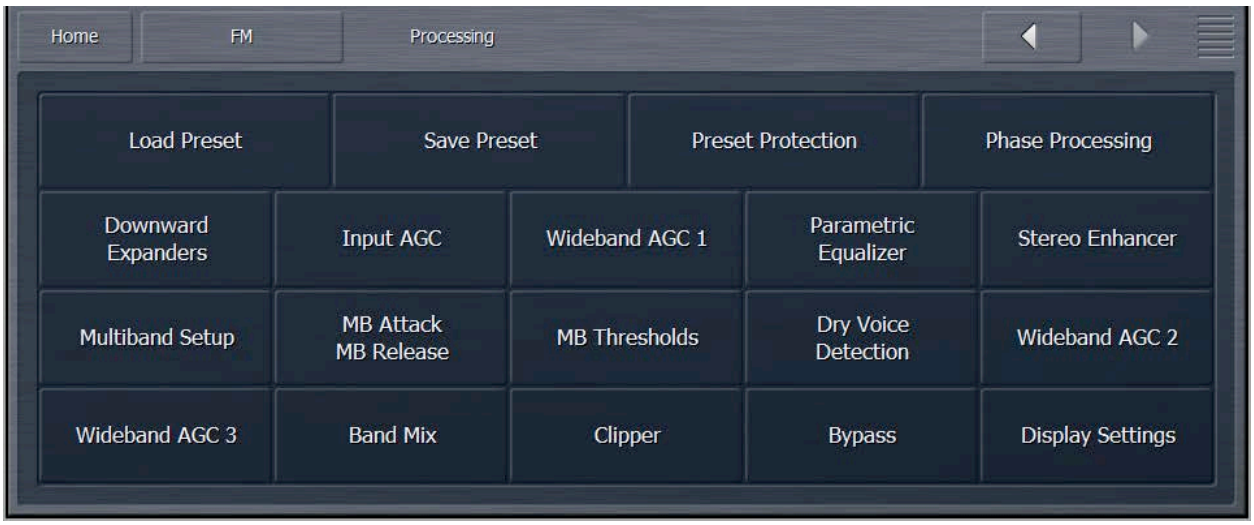
By familiarizing yourself with the FM section – which is the primary and perhaps most familiar section of any processor - you can get to know the menu interfaces and the function of the various controls.

Fair warning: There is no shortage of controls in Omnia.9! It was deliberately designed to provide a very comprehensive set of tools and give you complete freedom to create exactly the sound you want and feel is best suited to your station in your market.

A complete rundown and explanation of the various menus found in the FM processing core is presented here.

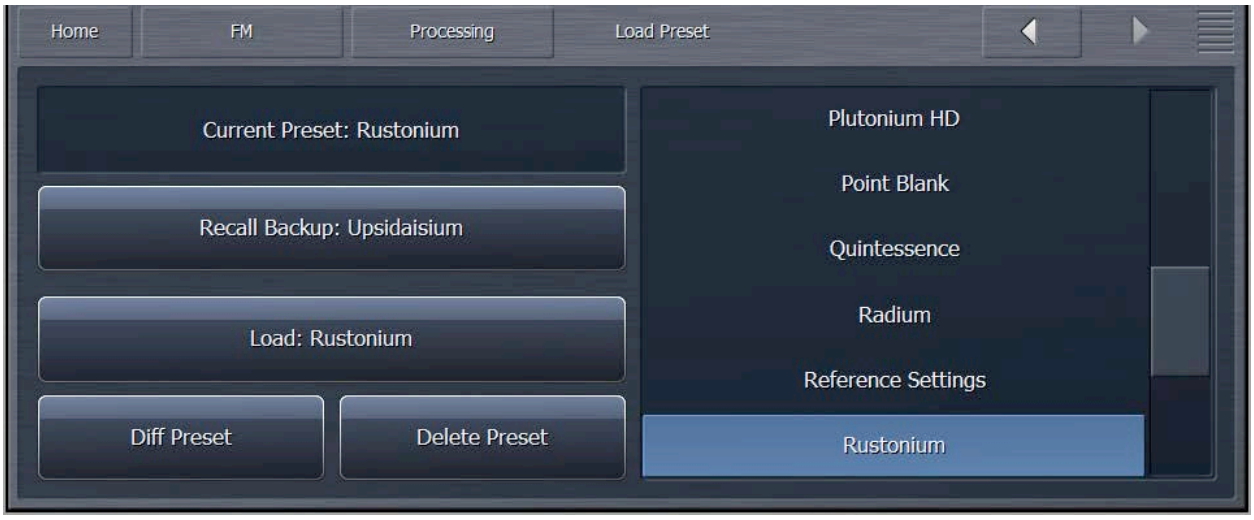
FM Processing Menu

The **FM Processing** menu provides access to all sections of the main FM processing core. From this menu, you can load and save presets, enable and configure Preset Protection, and adjust phase-related processing such as the Phase Scrambler, Phase Rotator, and Bass-EFX circuit. This is also where you can adjust audio parameters including the Downward Expanders, Input AGC, Wideband AGCs, Parametric Equalizer, Multiband Stereo Enhancer, Multiband AGC and Limiters, Band Mix, Dry Voice Detector, and Clipper.



Load Preset Menu

The **Load Preset** menu allows you view the preset currently on the air, toggle back and forth between the current and backup presets, load a new preset, compare the settings of two presets, and delete user presets.



Highlighting a preset from the list places it in the Load button. Selecting the Load button puts that preset on the air and moves it up to the Current Preset position. The preset that was previously on the air will become the Backup Preset. You may also place a preset on the air from the list directly by double tapping it.

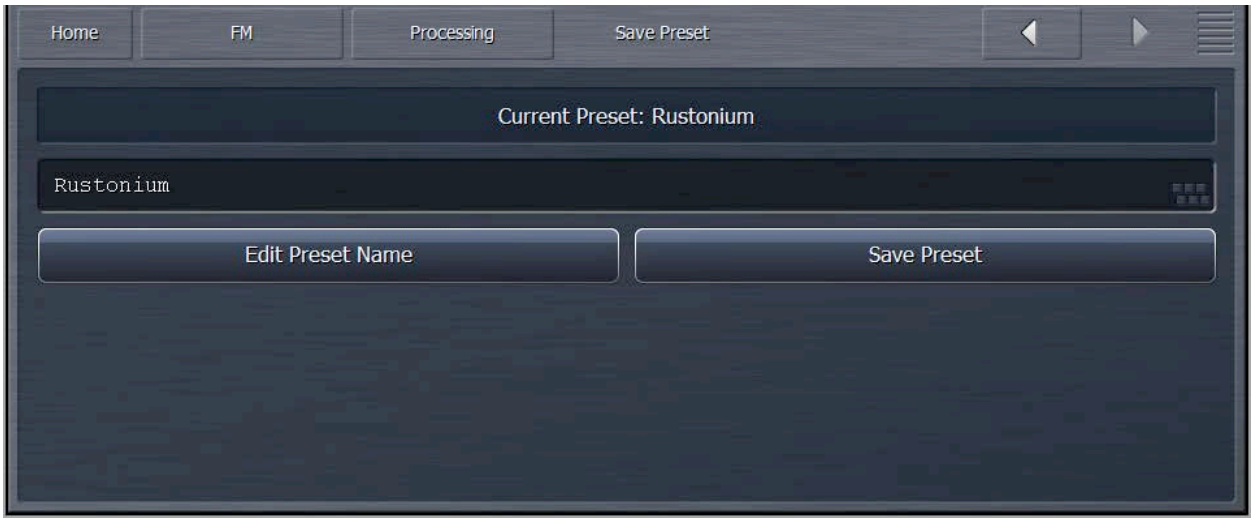
After changing any parameter of a preset, an (M) appears next to the Current Preset name and the text turns yellow to indicate the preset has been modified but not yet saved. The Backup Preset also becomes the former (and unmodified) Current Preset. This allows you to toggle back and forth to hear the difference between the original and modified presets on-air by simply clicking the backup button to swap the current and backup slots.

Changes to each parameter you adjusted to create the modified preset are also displayed in yellow on the specific control button in each section of the processing core, providing an instant visual comparison between the modified preset and the original preset upon which it is based.
You can also compare the differences between the Current Preset and the Backup Preset by selecting the Diff Preset button. Any control settings in the Current Preset that are different from those in the Backup Preset will be displayed in yellow in their respective sections. In addition, the backup value of each control is indicated by a small arrow on the bottom of the control itself.

Selecting the Delete Preset button allows you to permanently delete user-created presets. Factory presets cannot be deleted.

Save Preset Menu

The Save Preset menu allows you to edit the name of or save over a user preset.



- You can rename your current preset, regardless of whether or not is has been modified, by selecting the **Edit Preset Name** button to bring up the on-screen keyboard. Type in the new name, select “OK”, and select Save Preset. The new preset will now appear in the list.

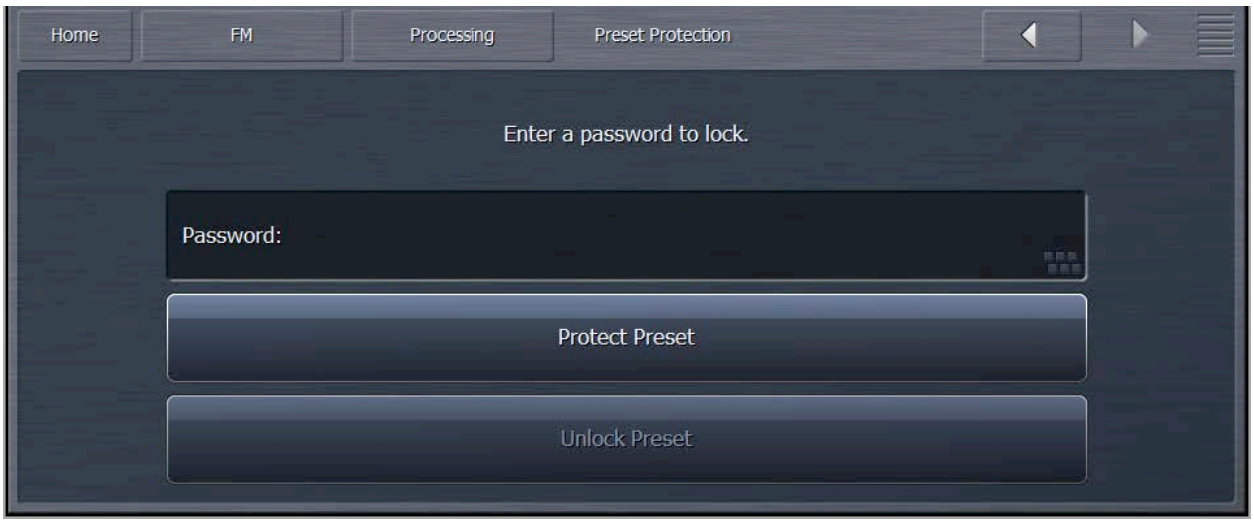
- If your Current Preset has been modified, you also have the option to write over the existing preset without renaming it by selecting **Save Preset**.

That said, we strongly recommend that after you’ve made some adjustments and are ready to save those changes to a Custom Preset you give it a unique name and instead of saving directly over your current version. That way, should there come a time when you want to revert to a previous incarnation of a preset, you can do so. You cannot, however, if you continually save over the same preset throughout your adjustment process instead of giving it a unique name.

Keep in mind that you cannot give a Custom Preset the same name as an existing Factory Preset.

Preset Protection Menu

The **Preset Protection** Menu allows you to password protect a preset so that it cannot be modified or copied for use in another Omnia.9. In addition, the settings for this preset will be hidden from view as long as the preset is locked.

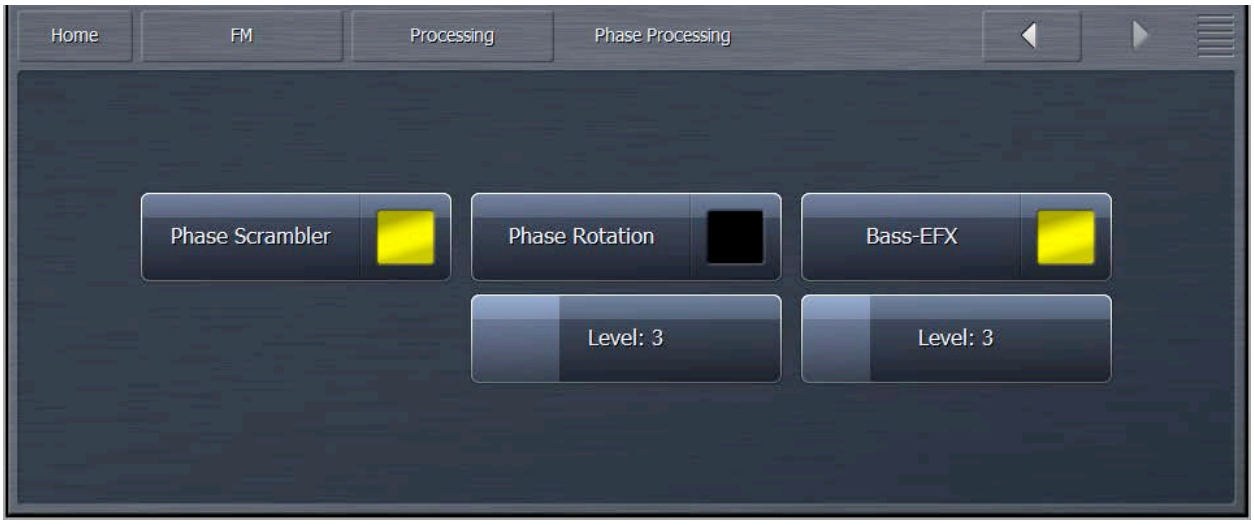


To password protect a preset, enter a password, click on “OK,” and then on “Protect Preset.” A warning dialogue box will appear. If your intention really is to protect the preset, select “Yes.” The final step is saving the new, protected preset with a unique name in the Save Preset menu. Protected presets appear in green in the Load Preset menu. Remember not to accidentally leave an unencrypted version your preset in the Backup Preset slot!

To un-protect a preset, return to the Preset Protection menu, enter your password, click on “OK,” and then on “Unlock Preset.”

Phase Processing Menu

The **Phase Processing** menu contains the controls for enabling the phase scrambler, enabling and adjusting the phase rotator, and enabling and adjusting the Bass-EFX control.



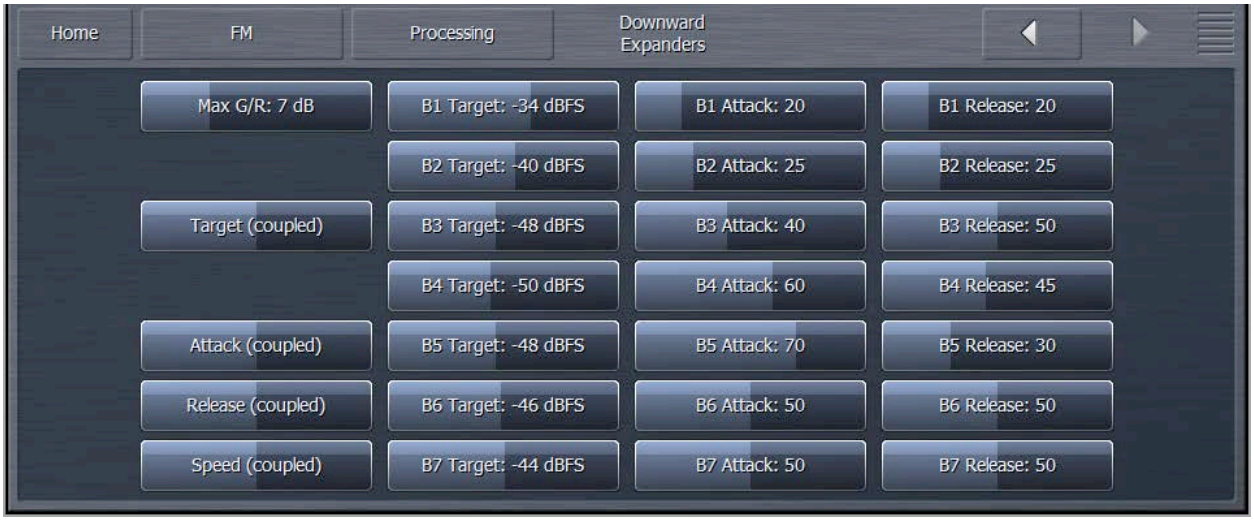
- The **Phase Scrambler** button enables or disables the phase scrambler. Certain sharp sounds with high harmonic content (such as trumpets or some synthesized sounds) are low in energy but contain high peaks. Since peaks must be limited to prevent over-deviation of the FM carrier, and the majority of those peaks will be removed by clipping, the sound may become dull and distorted. The Phase Scrambler, without employing limiting or clipping of its own, slightly offsets the various harmonics present in the audio to drastically lower the peak level, thereby allowing much more of the audio to pass through the final clipper. The result is a dramatically improved high end and less distortion.

- The **Phase Rotator** button enables or disables the phase rotator. Phase rotation is recommended primarily for stations airing talk programming who are also trying to achieve high levels of loudness as it can adversely affect transient “punch” desirable on music formats. The Level Slider adjusts the amount of phase rotation. Carefully monitor the MPX Output signal on the oscilloscope while listening to dry voice and advance the slider just enough to achieve symmetrical peaks. The default setting is 2.

- The **Bass-EFX** menu allows you to enable or disable the Bass-EFX feature and, when enabled, adjust the level of Bass-EFX processing. When used in conjunction with heavier overall levels of processing, Bass-EFX helps retain the punch of low-frequency transients such as those found in a kick drum by spreading the bass energy out in time, thus allowing more of the energy of a bass kick to pass through the clippers. Bass-EFX does not itself add energy.

Downward Expanders Menu

The **Downward Expanders** menu allows you to control the maximum gain reduction (downward expansion) for all bands in the Downward Expanders section as well as the threshold, attack and release speeds for each individual band. The total number of bands available in the Downward Expanders section is determined by the number of bands of processing used in the Current Preset.



The Downward Expanders operates in a manner similar to a traditional “noise gate,” and is useful for reducing unwanted background noise from less-than-perfect program material or from a noisy studio environment. The ratio of these expanders is 2:1.

- The **Maximum Gain Reduction** control determines the greatest amount of gain reduction for all available bands.

- The **Threshold** control for each band sets the point at which downward expansion begins. The range of this control is from -90 to 0dB. The **Threshold (Coupled)** control allows all bands to be adjusted simultaneously by an identical amount.

- The **Attack** control determines the speed with which the Downward Expanders act to reduce gain in each band when the program audio falls below the threshold. Lower settings provide slower attack speeds, while higher settings result in faster attack speeds.

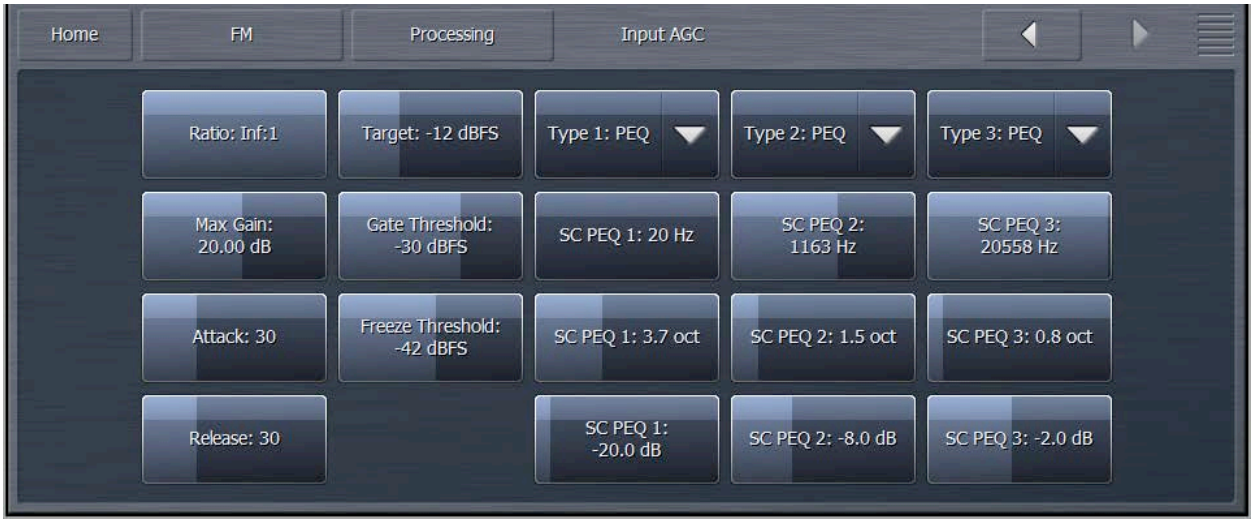
- The **Release** control determines the speed with which the Downward Expanders act to return gain to each band when the program audio rises above threshold. Lower settings provide slower release speeds, while higher settings result in faster release speeds.

Input AGC Menu

The **Input AGC** Menu is used to set the ratio, maximum gain, attack rate, release rate, target, gate threshold, freeze threshold, and sidechain equalizer controls.

The Input AGC is the first gain control stage in Omnia.9 following Undo, and is designed to be used as a slower-acting leveler ahead of the Wideband AGC1 and multiband compressor sections that follow it.

It is worth noting that traditional processors only act upon audio above a particular threshold. They are driven into various amounts of gain reduction, but once the audio falls below the threshold, they "run out of room" or "top out," and are incapable of increasing the audio any further. They require some sort of make-up gain control later in the audio chain. The compressors in Omnia.9 operate above AND below threshold, controlling the dynamics over a much wider range and do not require makeup gain.



- The **Ratio** control determines how much the output audio will be increased or decreased in relationship to the input audio of the Input AGC section. For example, a ratio of 3:1 means for every 3dB of change in the level of the input audio, the output will be changed by 1dB. Lower (looser) settings provide less control of the dynamics in this section but provide a more open sound, while higher (tighter) settings provide more control at the expense of openness. The range of this control is 1.0:1 to Infinity:1.

- The **Maximum Gain** control works in conjunction with the Ratio control to determine how much gain is available below threshold. If the Input AGC Ratio is set at Infinity:1 and the Input AGC Maximum Gain is set to 36dB, the Input AGC has 36dB of range below threshold. At a ratio of 2.0:1 and the same Maximum gain setting, the range is reduced by half to 18dB. The scale to the left of

the Input AGC meter automatically adjusts as needed when changes are made to the Input AGC Maximum Gain or the Input AGC Ratio to accurately reflect how much range is available below threshold.

- The **Attack** control determines the speed with which the Input AGC acts to reduce audio above threshold. Lower settings represent slower attack speeds and allow more audio to pass unprocessed by the Input AGC into subsequent processing stages. Higher settings result in faster attack speeds and allow less unprocessed audio to enter subsequent sections. Because all of Omnia.9's processing stages are to some extent program-dependent, putting actual measures of time on these controls would be pointless, and so the numbers on the various Attack and Release controls throughout are simply relative numbers.

- The **Release** control determines the speed with which the Input AGC increases audio below threshold. Lower settings provide slower release speeds, while higher settings result in faster release speeds.

- The **Target** control sets the target output level of the Input AGC. A lower setting results in a lower output level, while higher settings provide a higher output level. This is similar to a traditional "threshold" control when the levels are below the target.

- The **Gate Threshold** and **Freeze Threshold** controls work together to determine the points at which the release rate of the Input AGC slows by a factor of 3 (gate threshold) or freezes altogether (freeze threshold). The range of these controls is -90dB to 0dB. Lower settings means the audio must drop to a lower level before the release speed slows or freezes. Higher settings means the audio doesn't have to drop as much in level before the input AGC gain slows down or stops. Using higher settings when employing faster Input AGC release speeds can keep the audio from being increased too quickly or too much during quieter passages or pauses. If the display is sized and configured in such a way that the Input AGC meter is shown vertically, a Gate condition will be indicated by a dim, dark red bar at the bottom of the meter. A Freeze condition will be indicated by a brighter dark red bar.

- The Input AGC features a fully-adjustable, 3-band **Sidechain Equalizer**, which allows you to make it more or less sensitive to particular frequencies. When the controls are not set to cut or boost any frequency, the Input AGC reacts to the full audio spectrum. When set to cut or boost a particular range of frequencies, the Input AGC becomes less sensitive (cut) or more sensitive (boost).

  In some earlier software versions, the sidechain EQ was not adjustable; it was simply enabled or disabled. For reference, the "hidden" PEQ settings were a 4.0 octave-wide cut of 20dB at 20Hz and a 2.9 octave-wide cut of 10dB at 2343Hz.

  In addition, an assortment of pre-configured filters are available, including a Low Pass Filter, a High Pass Filter, a Band Pass Filter, a Notch Filter, a Low Shelf EQ, and a High Shelf EQ.

  - The **Type** drop down menu determines what type of EQ or filter is employed.

  - The **Frequency** slider is used to set the center frequency for each band. The range of this control is 20 to 22,050Hz.

  - The **Width** slider determines how much audio above and below the center frequency will also be affected by any boosts or cuts in gain. The range of this control is 0.0 to 10.0 octaves in one-tenth octave increments. Lower values provide a narrower (sharper) boost or cut, while higher values provide a wider (gentler) boost or cut.

- The **Gain** slider determines how much the audio selected with a combination of the Frequency and Width sliders is boosted or cut. Each band can be boosted or cut by 12dB in one-quarter dB increments for a total range of 24db per band.

    - ***Note:*** *You can see a visual representation of the sidechain EQ curve in a display window using Omnia.9's built-in RTA by navigating to FM> Processing> Display Settings and choosing the Sidechain> AGC Sidechain option. A full explanation of Display Settings is provided later in this chapter.*

Wideband AGC1 Menu

The **Wideband AGC1** menu provides access to the sidechain delay, maximum gain, maximum gain reduction, ratio, attack, release, progressive release, target, gate threshold, freeze threshold, and three-band sidechain parametric equalizer controls.

- The **Wideband AGC1 Enable** button enables this section, which follows the Input AGC section and provides additional wideband compression as determined by its various controls. Disabling the Wideband AGC1 also makes this patch point unavailable in an oscilloscope or RTA display window.

- The **Bypass** button removes the Wideband AGC1 compressor from the audio path, but its patch point remains an available option for viewing on the oscilloscope or RTA via the Display Settings menu.

- The **Sidechain Delay** feature is useful for both adding punch and managing the amount of low frequency power (while increasing bass punch). This is an especially useful "trick" for maintaining apparent loudness when operating under MPX Power regulations.

- The **Maximum Gain**, **Ratio**, **Attack** rate **Release** rate, **Target**, **Gate Threshold**, and **Freeze Threshold** controls work in the same manner as their counterparts in the other sections of the Omnia.9. However, the Maximum Gain control in the Wideband AGC1 section has a range of 24dB.

- The **Maximum Gain Reduction** control sets the maximum amount of gain reduction possible in the Wideband AGC1 compressor, and is adjustable from 0 to 24dB in one-quarter dB increments.

- The **Progressive Release** control determines the degree to which the Wideband AGC1 compressor releases its gain at a faster rate as the audio is driven further toward or into gain reduction. At a setting of 0, the control has no effect and the Release speed control fully determines

the rate of release. Increasing the setting progressively makes the release speed of the audio faster as gain decreases.

- The 3-band **Sidechain Equalizer** can be used to make the Wideband AGC1 more or less sensitive to the frequencies determined by the Frequency, Width, and Gain controls, which function exactly like their counterparts in the Input AGC section above. A PEQ preview patch point similar to the one described in the Input AGC section is also available here.

Parametric Equalizer Menu

The **Parametric Equalizer** menu allows you to set up the 6-band phase-linear parametric equalizer, which is located just ahead of the multiband section of the processing core. In addition, an assortment of pre-configured filters are available, including a Low Pass Filter, a High Pass Filter, a Band Pass Filter, a Notch Filter, a Low Shelf EQ, and a High Shelf EQ.

- The **Bypass** button removes the equalizer from the audio path.
- The **Type** drop down menu determines what type of EQ or filter is employed.
- The **Frequency** slider is used to set the center frequency for each band. The range of this control is 20 to 22,050Hz.
- The **Width** slider determines how much audio above and below the center frequency will also be affected by any boosts or cuts in gain. The range of this control is 0.0 to 10.0 octaves in one-tenth octave increments. Lower values provide a narrower (sharper) boost or cut, while higher values provide a wider (gentler) boost or cut.
- The **Gain** slider determines how much the audio selected with a combination of the Frequency and Width sliders is boosted or cut. Each band can be boosted or cut by 12dB in one-quarter dB increments for a total range of 24db per band.

Although changes made in the parametric equalizer section are offset somewhat by the action of the multiband compressors that follow, this does not occur to the degree you might expect based upon your experience with other processors. The parametric equalizer in Omnia.9 is a very versatile and powerful tool for creating your on-air sound. A visual representation of the effects of the PEQ using the built-in real time analyzer can be seen in the RTA portion of the Display Settings section of this manual.

Stereo Enhancer Menu

Omnia.9 offers a unique multi-band Stereo Enhancer, whose total number of bands is determined by the number of bands of processing used in the Current Preset. Regardless, it never works on bass, which is why Band 1 is never represented and Band 2 may be grayed out. This approach significantly reduces the chance that quieter, hard-panned stereo sounds in a recording with a strong centered mono sound will be shifted out of phase and offers much greater control over the stereo enhancement available in various portions of the spectrum.

- The **Stereo Enhancer** menu gives you access to the Target, Maximum Gain, Maximum Gain Reduction, Attack speed, and Release speed of each of its bands.
- The **Enable** control turns the Stereo Enhancer on or off.
- The **Target Width** control determines the ratio of L+R to L-R. Higher settings provide more stereo enhancement. Adjust this control carefully to avoid turning the stereo image “inside out” by allowing L-R to overpower L+R which ruins mono compatibility and increases multipath distortion.
- The **Maximum Gain** control determines how much the Stereo Enhancer can increase L/R separation in an effort to achieve the Target Width in program material that has a narrow stereo image. The range is between 0 and 18dB.
- The **Maximum Attenuation** control determines how much the Stereo Enhancer can reduce L/R separation in an effort to achieve the Target Width in program material that already has a wide stereo image. The range is between 0 and 18dB.
- The **Attack** control determines the speed at which the stereo image is narrowed. The **Release** control determines the speed at which the stereo image is widened.
- The **Target Width** (coupled), **Maximum Gain** (coupled), **Maximum Attenuation** (coupled), **Attack** (coupled) and **Release** (coupled) controls allow you to adjust all the bands simultaneously by an equal amount in their corresponding sections.

Multiband Setup Menu

The **Multiband Setup** menu provides control over the number of processing bands employed as well as the maximum gain, progressive release, gate threshold, freeze threshold, and gate delay controls. Also found here are the enable buttons for gain reduction override and controls for the gain reduction ratio.

- The **Band** slider determines the number of bands in the multiband processing section and ranges from 2 to 7.

- The **Maximum Gain**, **Ratio**, **Gate Threshold**, and **Freeze Threshold** controls work in the same manner as their counterparts in other sections of the Omnia.9.

- The **Gate Delay** control determines how long the Gate Threshold and Freeze Threshold controls wait before they begin working. The range of this control is between 0 and 255ms. Setting the control to “0” means that as soon as audio falls below the threshold as determined by the settings of the Gate and Freeze controls, it immediately slows or stops, respectively. Higher settings mean it will take longer for the release of the audio to slow or stop. A Gate condition will be indicated by a dim, dark red bar at the bottom of the multiband meters. A Freeze condition will be indicated by a brighter dark red bar.

    - ***Note:*** *Setting the Gate Delay much lower than the default setting of 79ms will cause the gate to take effect during the brief pauses in dry speech, resulting in a much lower volume level from an announcer mic, for instance, as compared to music. Used creatively, this is actually a very useful tool for controlling announcer/music level balance.*

- The **Progressive Release** control determines the degree to which the Multiband compressor releases its gain at a faster rate when the audio is driven further toward or into gain reduction. At a setting of 0, the control has no effect and the Release speed control fully determines the rate of release both below and above threshold. Increasing the setting progressively makes the release speed of the audio faster as gain decreases.

- The **Gate Threshold** and **Freeze Threshold** controls work in the same manner as their counterparts in the other sections of the Omnia.9.

- The **Gain Reduction Ratio Override** and **Gain Reduction Ratio** controls work together to let you set a different ratio for each band when audio in that band crosses above threshold – that is, when it is driven into gain reduction. The ratio for audio below threshold is always determined by the Ratio control for all bands. Specifically, the Gain Reduction Ratio Override control enables or disables the Gain Reduction Ratio controls, which are sliders that let you set the ratio of audio above threshold from 1:1 to Inf:1.

It is worth mentioning again here the importance of a concept unique to Omnia.9. Most (if not all) other processors “top out at 0” – that is, they constantly operate in a state of gain reduction, and once the audio falls below threshold, they can no longer increase it any further. To make up for the fact that they are capable only of reducing gain, they rely upon a “makeup gain” control somewhere downstream in the audio chain to get the levels back up. Omnia.9 is not only capable of gain reduction – that is, driving audio levels above threshold as other processors do – but is also capable of increasing gain below threshold, which makes it possible to employ powerful controls like Progressive Release and Gain Reduction Ratio Override.

Multiband Attack/Release Menu

The **Multiband Attack/Release** section lets you control the Attack Speed and Release Speed of each band in the multiband AGC section.

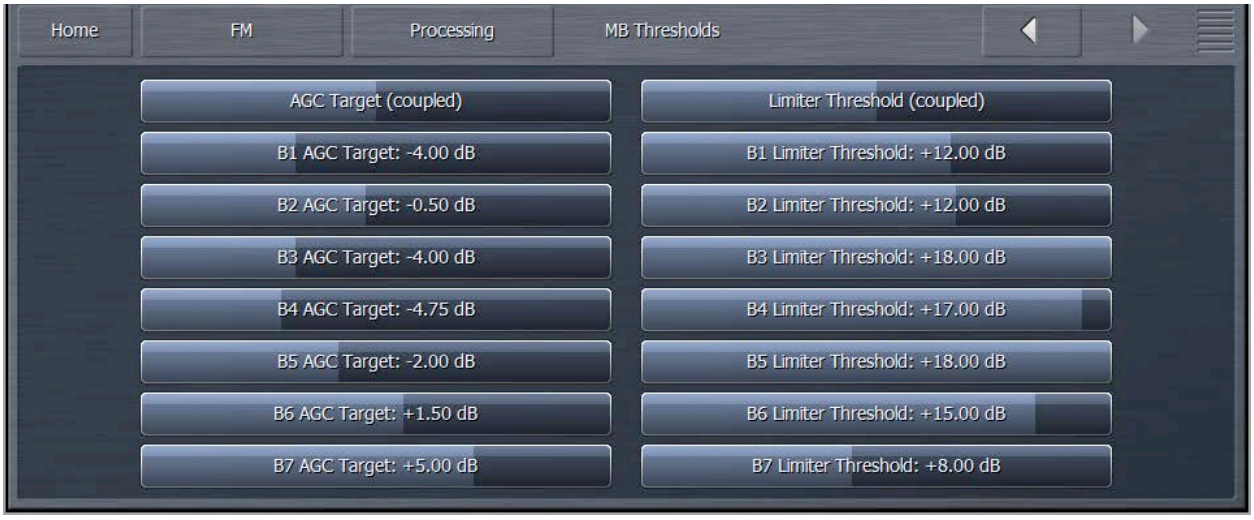
- The **Attack** speed and **Release** speed controls work in the same manner as their counterparts in the other sections of the Omnia.9. However, the behavior of the multiband AGC compressors is also program-dependent.
- The **Attack (coupled)** control allows you to adjust the attack speed of all of the bands simultaneously by an equal amount.
- The **Release (coupled)** control allows you to adjust the release speed of all the bands simultaneously by and equal amount.
- The **Speed (coupled)** control allows you to adjust both the Attack speed and Release speed of all the bands simultaneously by an equal amount.
- The **Peak Sense (Coupled)** control simultaneously adjusts the attack and release rates but in opposition to one another. Sliding the control to the right increases the attack rate and slows the release rate, making it more peak sensitive. Sliding the control to the left decreases the attack rate and speeds up the release rate, making it less peak sensitive.

The attack and release speeds of the multiband limiters are program-dependent and not adjustable.

Multiband Thresholds Menu

The **Multiband Thresholds** menu allows you to set the target for each of the Multiband AGC bands as well as the threshold for each band of the Multiband Limiters. The total number of bands available in the

Multiband Thresholds section is determined by the number of bands of processing used in the Current Preset.

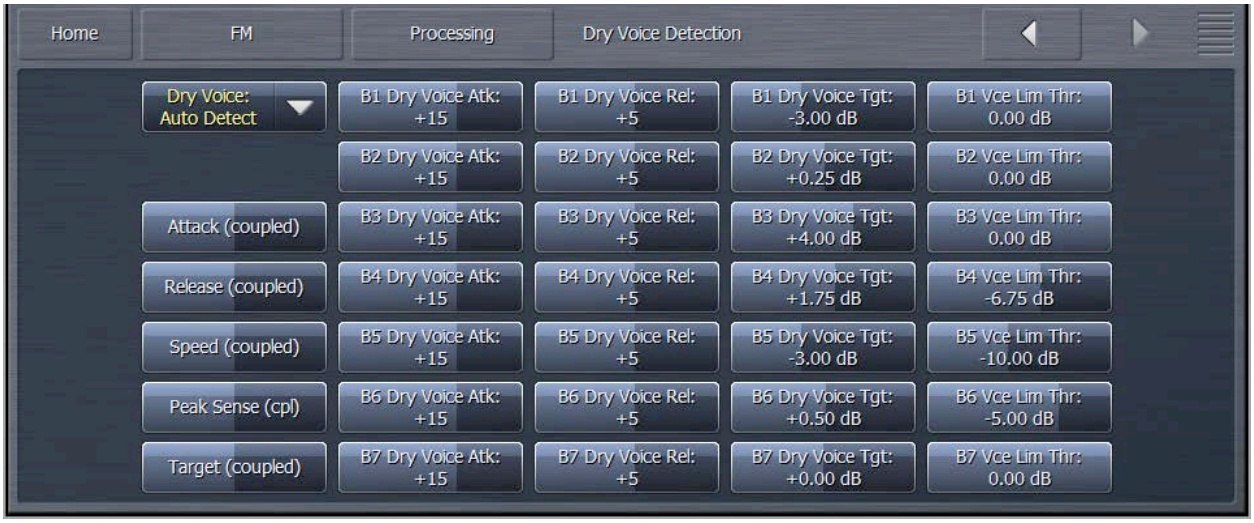

Home
FM
Processing
MB Thresholds
AGC Target (coupled)
B1 AGC Target: -4.00 dB
B2 AGC Target: -0.50 dB
B3 AGC Target: -4.00 dB
B4 AGC Target: -4.75 dB
B5 AGC Target: -2.00 dB
B6 AGC Target: +1.50 dB
B7 AGC Target: +5.00 dB
Limiter Threshold (coupled)
B1 Limiter Threshold: +12.00 dB
B2 Limiter Threshold: +12.00 dB
B3 Limiter Threshold: +18.00 dB
B4 Limiter Threshold: +17.00 dB
B5 Limiter Threshold: +18.00 dB
B6 Limiter Threshold: +15.00 dB
B7 Limiter Threshold: +8.00 dB

- The **AGC Target** controls set the target output level of each band of the Multiband AGC. A lower setting provides a lower output level, while a higher setting provides a higher output level. These controls have a range between +12 and -12dB in one-tenth dB increments.

- The **Limiter Threshold** controls determine at which point the Multiband Limiter acts upon the incoming audio for its particular band relative to its corresponding AGC Target. For example, a setting of +6dB means that any peaks of less 6dB above the AGC Target level will not be processed by the limiter. These controls have a range between +18 and 0dB in one-tenth dB increments.

Dry Voice Detection Menu

The **Dry Voice Detection** Menu contains the controls to enable the dry voice detector circuit and adjust the dynamics section of Omnia.9 when this feature is engaged.


Home
FM
Processing
Dry Voice Detection
Dry Voice: Auto Detect
Attack (coupled)
Release (coupled)
Speed (coupled)
Peak Sense (cpl)
Target (coupled)
B1 Dry Voice Atk: +15
B1 Dry Voice Rel: +5
B1 Dry Voice Tgt: -3.00 dB
B1 Vce Lim Thr: 0.00 dB
B2 Dry Voice Atk: +15
B2 Dry Voice Rel: +5
B2 Dry Voice Tgt: +0.25 dB
B2 Vce Lim Thr: 0.00 dB
B3 Dry Voice Atk: +15
B3 Dry Voice Rel: +5
B3 Dry Voice Tgt: +4.00 dB
B3 Vce Lim Thr: 0.00 dB
B4 Dry Voice Atk: +15
B4 Dry Voice Rel: +5
B4 Dry Voice Tgt: +1.75 dB
B4 Vce Lim Thr: -6.75 dB
B5 Dry Voice Atk: +15
B5 Dry Voice Rel: +5
B5 Dry Voice Tgt: -3.00 dB
B5 Vce Lim Thr: -10.00 dB
B6 Dry Voice Atk: +15
B6 Dry Voice Rel: +5
B6 Dry Voice Tgt: +0.50 dB
B6 Vce Lim Thr: -5.00 dB
B7 Dry Voice Atk: +15
B7 Dry Voice Rel: +5
B7 Dry Voice Tgt: +0.00 dB
B7 Vce Lim Thr: 0.00 dB

Dry voice is one of the most difficult waveforms to process cleanly, as the human voice is complex in nature and is typically asymmetrical in form. Stations that choose to process aggressively in an effort to

maximize loudness may find that bare vocals come through with unacceptably high levels of audible distortion.

Omnia.9 overcomes this situation by automatically detecting (in the Auto mode) when the input audio is dry voice and using a separate set of multiband targets, attack rates, and release rates. This allows the dynamics section to do more of the “heavy lifting” and reduces the amount of clipping necessary to maintain the same level of loudness.

- The **Dry Voice** dropdown menu can be set to “Off”, “Auto”, or “Force”. “Off” completely turns off this feature. “Auto” allows the processor to automatically detect the presence of dry voice. “Force” overrides the main multiband settings and uses the Dry Voice Detection settings at all times. The default setting depends upon preset chosen; most presets have this featured set to “Off” by default, while the default setting for more aggressive, loudness-driven presets is “Auto.”

- The **Attack**, **Release**, **Target**, **Limiter Threshold**, **Attack (Coupled)**, **Release (Coupled)**, **Speed (Coupled)** and **Target (Coupled)** controls provide relative adjustments referenced to their counterparts in the Multiband section.

- The **Peak Sense (Coupled)** control simultaneously adjusts the attack and release rates but in opposition to one another. Sliding the control to the right increases the attack rate and slows the release rate, making it more peak sensitive. Sliding the control to the left decreases the attack rate and speeds up the release rate, making it less peak sensitive.

Wideband AGC2 Menu

The Omnia.9’s Wideband AGC2 control allows you to insert one additional AGC processing stage into the chain as outlined in detail below.

The **Wideband AGC2** menu provides access to the transient enhance, maximum gain, maximum gain reduction, ratio, attack, release, progressive release, target, gate threshold, freeze threshold, and three-band sidechain parametric equalizer controls.

- The **Bypass** button removes the Wideband AGC1 compressor from the audio path, but its patch point remains an available option for viewing on the oscilloscope or RTA via the Display Settings menu.

- The **Transient Enhance**, **Maximum Gain**, **Ratio**, **Attack** speed, **Release** speed, **Target**, **Gate Threshold,** and **Freeze Threshold** controls work in the same manner as their counterparts in the Wideband AGC1 section.

- The **Wideband AGC2** dropdown control enables or disables the Wideband AGC2 section and allows you to choose whether it is situated before or after the Multiband AGC section or used as a dedicated Bass Compressor.

- If you use the AGC2 as a **Bass Compressor**, it will be situated after the Multiband section but will affect only the lower bands, and allow you to push the bass a bit harder without over-driving the final clipper or using excessively fast attack and release speeds in the lower bands of the Multiband AGC.

- **Bass Only** (“BO”) employs a sidechain filter that allows only the audio from the lower bands to affect gain, so only the lower frequencies are compressed above threshold.

- **Bass Wideband** (“BW”) also employs a sidechain filter, but one that contains the entire audio spectrum, so the bass becomes more compressed when the entire mix is above threshold. This mode is most useful when loudness is your primary processing goal, as it could allow full-scale bass audio in circumstances when there is no mid-range or treble audio present. However, there will be less bass present in situations when there are other frequencies present.

Wideband AGC3 Menu

The **Wideband AGC3** menu operates in the same manner as Wideband AGC2, with all of the same controls, but with one difference: It cannot be used as a wideband compressor before the multiband section, only after. It can, however, be used in the Bass Only or Bass Wideband mode just like Wideband AGC2.

Band Mix Menu

The **Band Mix** Menu allows you to adjust the final output of each band after all Wideband and Multiband processing has been applied. It can be used very effectively to tailor the overall spectral balance of your sound, but keep in mind that this is the final point of adjustment before the audio reaches the Final Clipper (FM core) or Final Limiter (HD and Streaming Cores). In other words, levels increased in the Band Mix section can only be controlled by final clipping or final limiting, which may result in unexpected or unwanted density on some material, so care is required when making adjustments here.

- Each **Band Level** control has a range of -12 to +12dB in one-quarter dB increments.
- The **Band Mix (coupled)** control allows you to adjust the output of all bands in the Band Mix section simultaneously and by an equal amount.

Clipper Menu

The **Clipper Menu** provides control of the final clip drive, bass clipper slope, bass clipper threshold, low frequency protection, high frequency protection, and A15 protection.

- The **Final Clip Drive** control sets the drive of the final clipper. Decreasing the drive (moving the slider to the left) reduces the amount of clipping. Conversely, increasing the drive (moving the slider to the right) will result in more clipping. Less clipping will result in a more open, less-processed, cleaner sound, but at the expense of overall loudness. More clipping can result in a louder on-air sound – but only up to a point. *Even if total dial domination and loudness are your processing goals, there comes a point when the final wave-form is completely full, and increasing the amount of clipping will no longer yield additional loudness – only more distortion.* We strongly recommend using Omnia.9's oscilloscope as well as your ears to monitor the MPX Output signal while adjusting the final clip drive. This control ranges from -6.0 to +6.0 in one-quarter dB increments, which should give you the (correct) impression that small changes make a big difference in the sound. Keep in

mind that a setting of +0.00 means the control is at the middle of its range, but does not necessarily mean that no clipping is taking place.

- The **Bass Clipper Slope** control determines the slope characteristics of the bass clipper.
  - **Slope 1** is filtered at a very low frequency so that the low bass stays “clean” even when clipped hard. However, some of the mid-bass will pass through the clipper, which may result in more of the final waveform being taken up by the bass. For lighter processing settings, Slope 1 offers the cleanest and punchiest bass sound.
  - **Slope 2** has a higher cutoff frequency than Slope 1, offering more control over the mid-bass while creating a “dirtier” bass sound with more harmonics. On certain formats, or when listening on a smaller radio, this may be a desirable effect.
  - **Slope 1+2** is simply Slope 1 followed by Slope 2. Most of the low bass will be controlled by Slope 1 and stay nice and clean, while the remaining bass will be taken care of by Slope 2 without affecting the low bass. If you are using heavier overall processing, this option will give you the cleanest sound.
- The **Bass Clipper Threshold** control sets the threshold of the Bass Clipper. Raising the threshold (moving the slider to the left) reduces the amount of clipping performed by the Bass Clipper, but place a greater burden on the Final Clipper. Conversely, lowering the threshold (moving the slider to the right) will yield more bass clipping, which takes some of the load off the Final Clipper, but may result in low frequency distortion if set too low.
- The **LF Protection Threshold**, **HF Protection Threshold**, and **A15 Protection Threshold** controls adjust the respective clip levels of the three protection clippers situated ahead of the final clipper, and help protect low frequencies from influencing high frequencies and vice versa. The various frequencies in the final wave-form will always be vying for space in the final clipper. Advancing these controls ensures their corresponding frequencies will always have at least some room reserved in the final clipper. However, setting the thresholds too high by advancing these controls too much will cause the sound to become dull and dense. These are very critical controls and allow you to determine exactly what goes into the final clipper. We strongly recommend listening very carefully to the sound with your ears and watching the waveform on the oscilloscope very carefully when setting these controls.
- The **LF Protection Threshold** controls frequencies between 0 and 1,500Hz, though audio in some of these frequencies will already have been dealt with by the bass clippers. The range of this control is -12.0dB to +12.0dB in one-tenth dB increments.
- The **HF Protection Threshold** controls frequencies between 1,500 and 17,500Hz. The range of this control is -12.0dB to +12.0dB in one-tenth dB increments.
- The **A15 Protection Threshold** controls frequencies between 15,000 and 16,500Hz. Omnia.9 is quite capable of passing audio in excess of the traditional 15kHz cutoff found in other FM processors because of its superior pilot protection. A low threshold setting of, say, -12dB allows these additional high frequencies to pass through while making sure the pilot is well protected. The range of this control is between -24.0dB and 0.0dB in one-tenth dB increments.

Display Settings Menu

The **Display Settings** Menu allows you to customize what is displayed in up to 8 different windows on-screen at the same time.

Each of the six Display buttons allows you to choose which processing parameters or visualizations from one of Omnia.9's valuable built-in diagnostic tools are viewable in each window. The ten main groups are Undo Meters, Processing Meters, Input Meters, Loudness Meters, Modulation Level (as bar graph meters), Modulation (as a numeric readout), Oscilloscope, RTA, and FFT Spectrum Analyzer.

You can also turn off any or all of Omnia.9's displays here – a handy feature for keeping your processing meters and settings from curious eyes!

Since Omnia.9 can display such a wide variety of information about your station's audio processing and signal, it allows you to create and save up to six **Display Presets**, which are always visible in the top right portion of the display. Any changes you make to the display settings are saved as you make them for that particular preset.

For example, you may wish to devote one preset to nothing but the Undo and Processing Meters to display these parameters in greater detail. Or, you could devote an entire preset to the oscilloscope and monitor the program input, the output of Undo, the MPX before the clipper, and the MPX output to see what the various stages within Omnia.9 are doing to the audio signal. The combinations are endless and yours to customize to suit your particular needs and preferences.

Undo Meters Menu

The **Undo Meters** button allows you to display the activity of the entire Undo section. Which specific Undo meters are displayed within this window is determined by settings in the Undo Metering portion of the main Undo menu, which is located in Omnia.9's Input section. A full explanation of the Undo meters is given in the section dedicated to using Undo.

- The **Delay** control, which is also present in (and coupled to) the Processing Meters, Oscilloscope, RTA, and FFT Spectrum Analyzer menus, lets you synchronize Omnia.9's meters with the audio to which you are listening. For example, if you are listening to a stream with a 10 second delay, it would be impossible to properly adjust the processing if that much time passed before you actually heard what you were seeing on the meters! By advancing the Delay control to 10,000ms, what your

eyes see on the meters will coincide with what your ears are hearing. Keep in mind, however, that any changes you make to the processing will still take 10 seconds to be audible.

Processing Meters Menu

The **Processing Meters** menu allows you to display the levels and activity of Omnia.9's various gain stages and processing sections.

Input Meters Menu

The **Input Meters** menu allows you to monitor the audio levels entering Omnia.9 with ITU BS.1770 bargraph meters.

Loudness Meters Menu

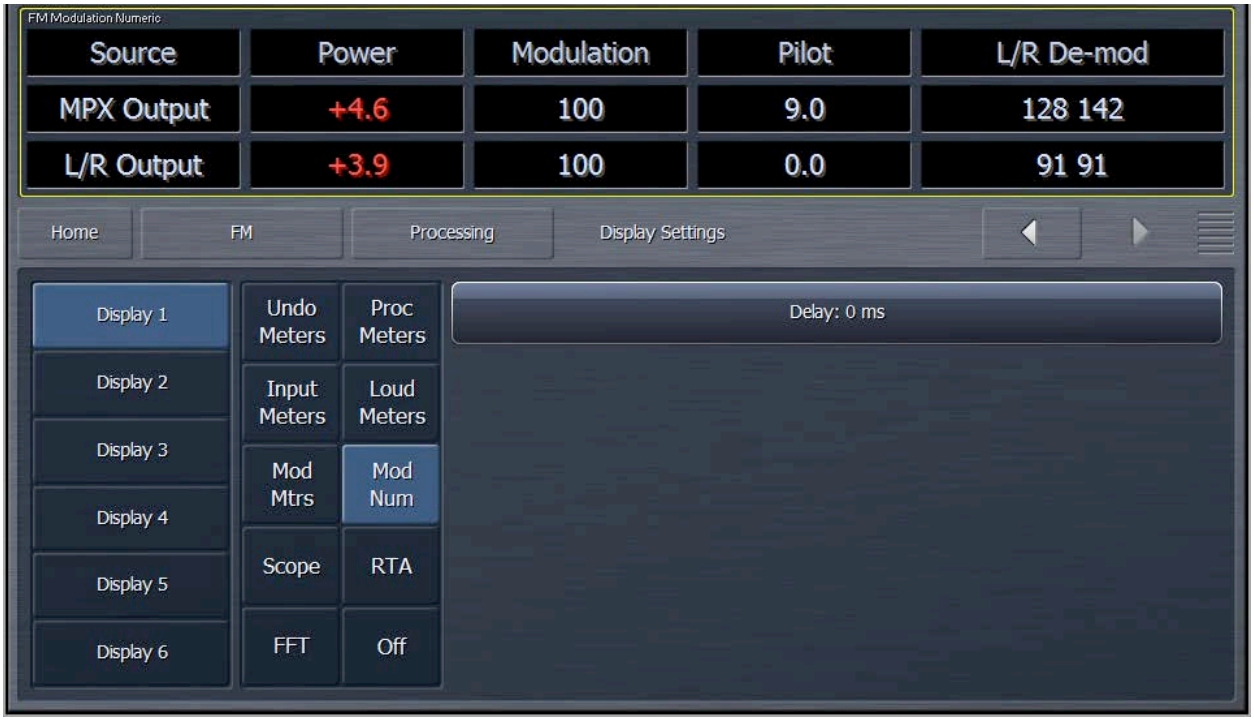
The **Loudness Meters** menu provides separate loudness meters for Program Input, MPX Output, L/R Output, and if enabled, the output levels of external gear feeding Omnia.9's MPX1 and MPX 2 inputs.

Modulation Meters Menu

The **Modulation Meters** menu displays the modulation levels of the MPX output of Omnia.9 as well as any processor or applicable tuner feeding the MPX1 or MPX2 inputs as a bar graph.

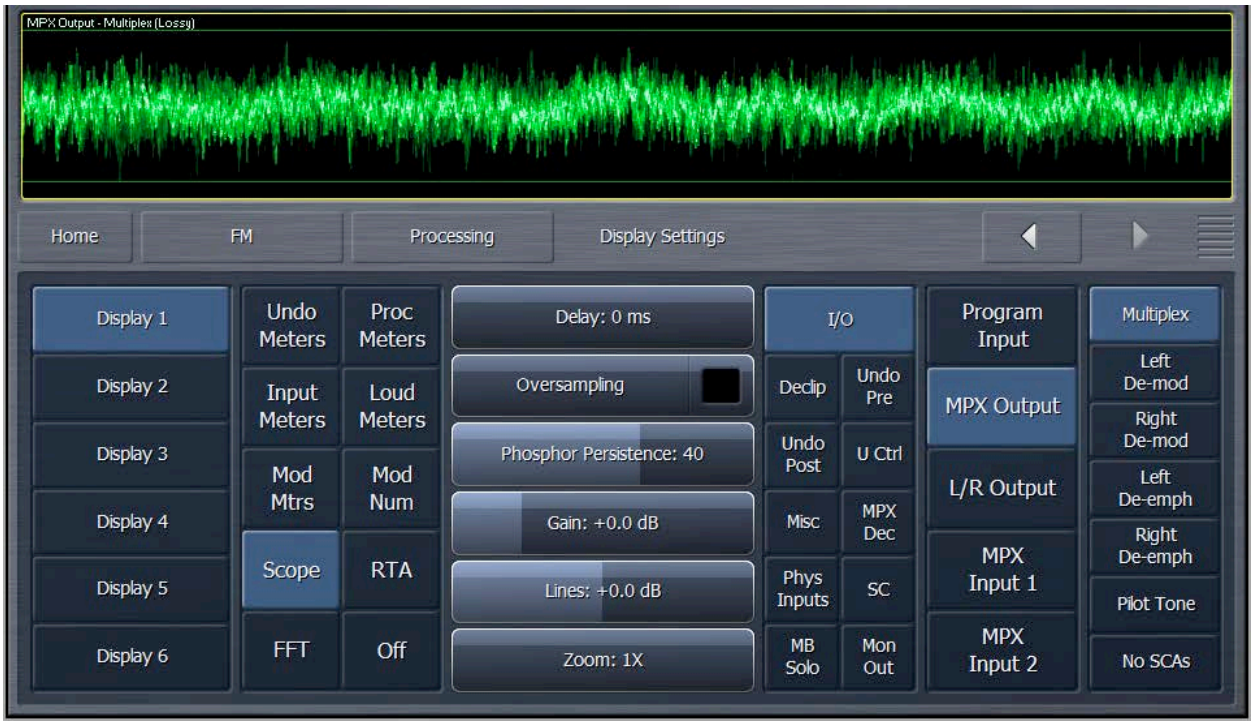
Modulation Numeric Menu

The **Modulation Numeric** menu indicates the modulation levels of the MPX output of Omnia.9 as well as any processor or applicable tuner feeding the MPX1 or MPX2 inputs as a numeric value relative to a 100% scale. The percentage of modulation occupied by the pilot and the L/R Demod level is also displayed.



Oscilloscope Menu

The **Oscilloscope** menu allows you to monitor a very wide variety of input and output points from various stages of Omnia.9's processing sections on the built-in oscilloscope.



- The **Delay** control works the same here as it does previous and subsequent display sections.

- The **Oversampling** control enables or disables the oscilloscope's 4x oversampling function. Without oversampling, some peaks may pass through without being displayed, giving an inaccurate view of the signal. This is most critical when monitoring the MPX Output or the L/R Pre-emphasis Output. However, since oversampling consumes more CPU resources, it is turned off by default.

- The **Phosphor Persistence** control adjusts how long latent images remain on the screen. A setting of 0 provides no image delay at all and offers the greatest amount of visual detail for the current information on the scope. Higher settings allow images of signal that has already passed through the scope to remain on the screen for progressively longer periods of time. Setting this control all the way to the right keeps the image from fading at all, useful for catching peaks.

- The **Gain** control adjusts the Y scale of the oscilloscope and moves the grid relative to the signal.

- The **Lines** control adjusts the offset of the reference lines as measured in dB.

- The **Zoom** control allows you to choose between a 1x, 2x, and 4x view of the X scale, similar to setting the sweep time of a traditional oscilloscope.

- The **I/O** (Input/Output) Menu allows you to view the audio signal at various points of the Program Input, MPX Output, L/R Output, MPX Input 1, MPX Input 2, and Pre-emph Input paths.

- From the **Program Input** patch point, you can view the left or right input audio signal.

- From the **MPX Output** patch point, you can view the Multiplex, left de-modulated, right de-modulated, left de-emphasized, or right de-emphasized audio signal as well as the pilot tone (obtained through a brick wall phase-linear band pass filter from 18,950 – 19,050Hz) and the MPX signal minus SCA carriers (obtained through a brick wall phase-linear low pass filter at 54,000Hz).

- From the **L/R Output** patch points, you can view the original pre-emphasized left/right audio signal, the de-emphasized left/right audio signal, as well as the MPX signal, a stereo coded version of the pre-emphasized left/right audio signals.

- From the **MPX Input 1** and **2** patch points, you can view the Multiplex, left de-modulated, right de-modulated, left de-emphasized, or right de-emphasized audio signal as well as the pilot tone and MPX signal minus SCA carriers.

- The **Pre-emph Input** allows you to view the original pre-emphasized left/right audio signal, the de-emphasized left/right audio signal, as well as the MPX signal, a stereo coded version of the pre-emphasized left/right audio signals. The pre-emph input is similar to the MPX Inputs, but is specifically for use with the L/R Outputs from another processor. This input can receive audio from any of the three digital inputs, but since it is not DC coupled, it is not designed to be used with the analog input.

- From the **De-clipper** patch point, you can view the audio signal before or after de-clipping in either the left or right channels.

- The **Undo Pre** patch points allow you to view the audio signal from each of the 5 individual bands of the Undo section after the de-clipper but before Undo's multiband expansion in either the left or right channel.

- The **Undo Post** patch points allow you to view the audio signal from each individual band or the combined output of all bands of the Undo section after the de-clipper AND after Undo's multiband expansion in either the left or right channel.

- The **Undo Control** Signal patch points allows you to view the control signal from each of the individual bands in either the left or right channel.

- The **Miscellaneous** patch points allows you to view the audio signal from various other points in the signal path, including after input filtering, after the multiband section, after the bass clipper, after input loudness matching, as an MPX signal with noise injection, and at the program passthrough point.

- From the **MPX Decoded** menu, you can view the decoded left or right channel of the MPX output of Omnia.9 as well as devices connected to the MPX1 and MPX2 inputs.

- The **Physical Inputs** menu displays the levels of the actual rear panel inputs, including Main Digital, AES Reference, Aux Digital, and Analog. These patch points are most useful when using the NfRemote client over the internet, as their original un-decoded counterparts may be not be available in the remotely due to insufficient network bandwidth.

- The **Sidechain** (SC) menu allows you to display left- and right-channel audio signals from both the sidechains and output sections of the Input AGC, Wideband AGC1, Wideband AGC2, and Wideband AGC3 compressors.

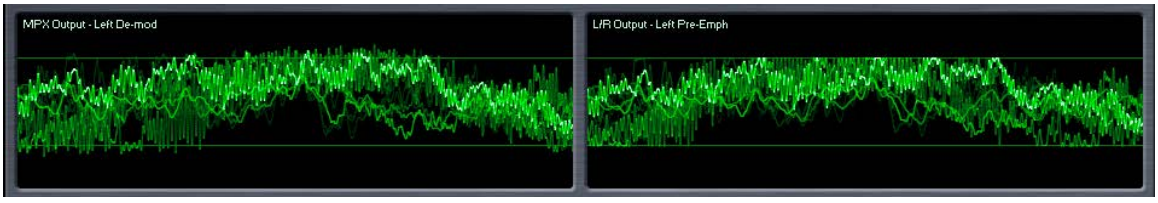
- From the **Multiband Solo** menu, audio from any one of the bands in the multiband compressor can be displayed. The number of available bands is determined by the number of bands employed in the current preset.

- The **Monitor Out** menu allows you to view the input (source) and output audio signals of the Speaker, Headphone, and Aux monitor points in either the left or right channel.

Below are some examples of how to use the oscilloscope:

As a High Frequency Headroom Monitor:
- Display the Left or Right Demod signal from the MPX Output menu
- Set Oversampling to “On”
- Set Phosphor Persistence to 50
- Set Gain to -3
- Set Lines to -1
- Set Zoom to 4x

Below is a comparison of this signal to the pre-emphasized output so you can see just how much additional HF headroom Omnia.9’s clipper provides!



As a Pilot Protection Monitor:
- Display the MPX Output
- Set Oversampling to “Off”
- Set Phosphor Persistence to 40

- Set Gain to 0
- Set Lines to 0
- Set Zoom to 1x

Note that what you are seeing here is the actual pilot extracted from the entire MPX signal.

RTA Menu

The **RTA** menu allows you to monitor many of the same sources as those mentioned in the Oscilloscope menu section. The horizontal scale along the bottom of the RTA screen shows frequencies from 20 to 20,000Hz. The vertical scale along the left side shows the amplitude of the audio in decibels.

- The **Delay** control works the same here as it does previous and subsequent display sections.
- The **RTA Resolution** control lets you choose between a 1/3 and 1/6 octave display.
- The **Averages** control can be used to slow down or speed up the RTA's display response. A lower average setting (faster meter response) might be more useful for peak monitoring; while a higher average setting (slower meter response) might be more useful for calibrating speakers. Higher

averages are also useful for adjusting lower frequencies. The recommended setting for speaker calibration is 100. Regardless of how the Averages control is set, the RTA maintains a history "buffer" of 1,000 frames. Advancing the control to 1,000 will immediately display the average of the last 1,000 frames.

- The **Target** control moves the dark red target window and/or the amplitude scale up and down within the display, a useful tool for establishing a target when performing speaker calibration.

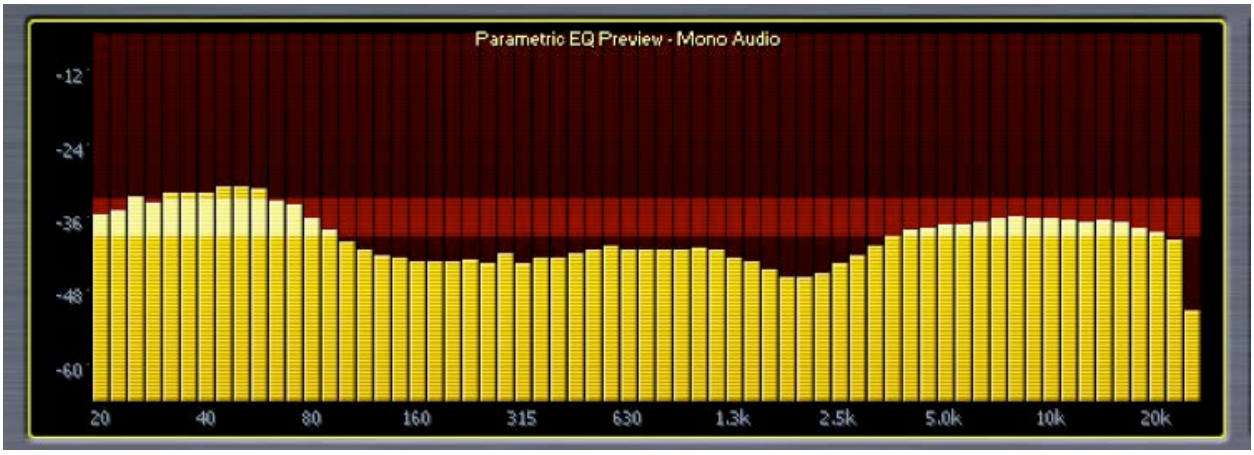
- The **Range** control allows you to view a broader or narrower range of audio, indicated by the range scale along the left side of the display.

- The **Target Range** adjusts the height of the target window within a 6dB range in half-decibel increments. Lower settings are better suited to more precise measurements. Moving the Target Range slider all the way to the left hides the target window.

Below is an example of how to use the RTA menu:

To see a visual representation of a parametric EQ (PEQ) setting:

- Display the MB DRC Solo menu and select PEQ Preview
- Set Resolution to 1/6 octave
- Set Averages to 100 to "freeze" the display



You will now be able to see the curve of the PEQ in the RTA display window. You can also view the curves of each band of the multiband compressor by selecting one of the Solo band buttons. Since the Solo bands relate to a dynamic section of the processing core, lowering the Averages slider will yield more of a "real time" view.

FFT Spectrum Analyzer Menu

The **FFT** menu allows you to monitor the same sources as those mentioned in the Oscilloscope menu section.

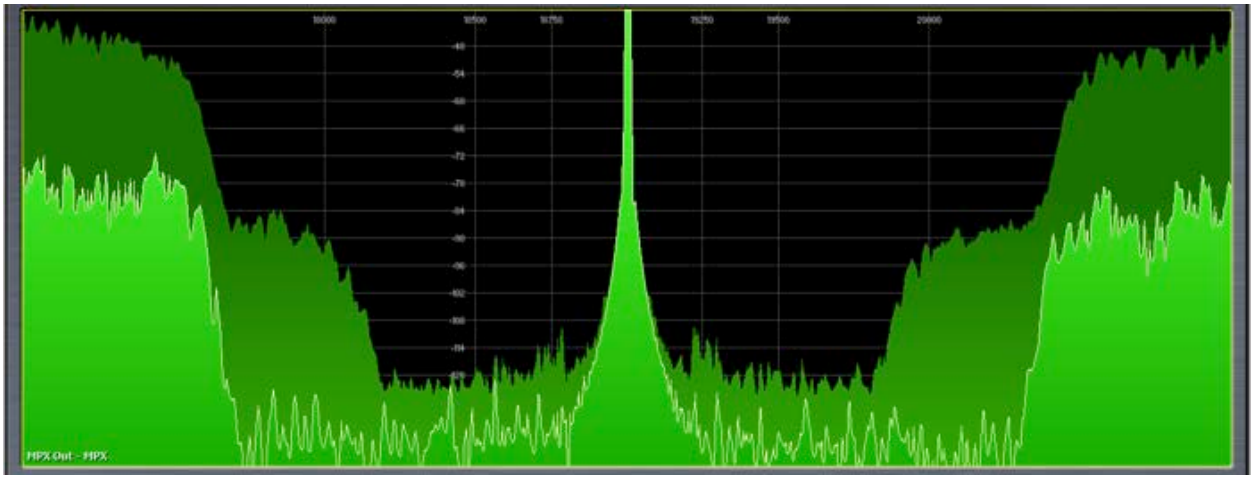
- The **Delay** control works the same here as it does previous and subsequent display sections.
- The **Resolution** control selects the number of frequency bands into which the audio is divided. 1x resolution gives you a refresh rate of approximately 48 frames per second and a frequency resolution sufficient for viewing the entire audio spectrum. 8x resolutions gives you a refresh rate of approximately 6 frames per second, but a much finer frequency resolution.
- The **Decay Rate** control adjusts how quickly the display will fall after a peak is displayed. Lower settings are the slowest, while the highest setting is instantaneous.
- The **Peak Hold** control enables or disables the ability to indicate and hold the highest peak achieved. Peak Hold is displayed in the dark green background layer.
- The **X-Center** control centers the display at the selected frequency.
- The **X-Width** control sets the displayed frequency range in kHz.
- The **Y-Center** control centers the display vertically around the selected level in dB.
- The **Y-Range** control sets the displayed level range in dB.
- The **dB Scale Position** control allows you to move the dB scale horizontally to a different place in the display. Advancing the control completely to the right places it in front of the graph at all times.

Below are some examples of how to use the FFT menu:

As a pilot protection monitor:

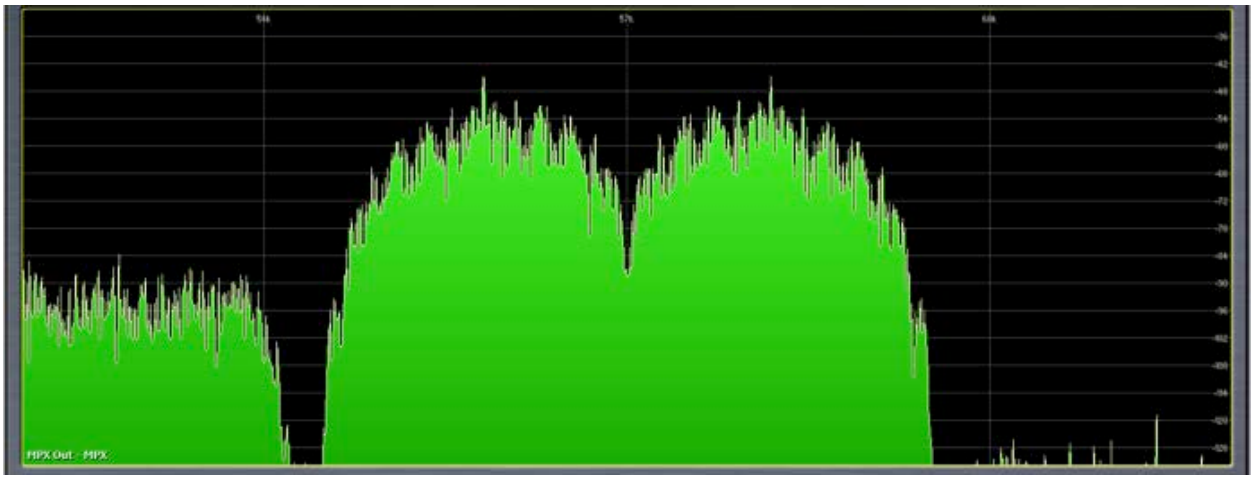
- Display the MPX Output
- Set Resolution to 8x
- Set Decay Rate to 6

- Set Peak Hold to “On”
- Set X-Center to 19kHz
- Set X-Width to 4kHz
- Set Y-Center to -90dB
- Set Y-Range to 100dB,
- Set dB Scale Position to 36



To display the RDS subcarrier:

- Display the MPX Output
- Set the Resolution and Decay rate to any setting
- Set Peak Hold to “Off”
- Set X-Center to 57kHz
- Set X-Width 10kHz
- Set Y-Center to -80dB
- Set Y-Range to 100dB
- Set dB Scale Position to 100



Chapter 10
FM Menu
ITU-R BS.412 Processing / MPX Power Limiting

“Develop a built-in BS detector.” - Ernest Hemingway

The FM Menu:
Processing for ITU-R BS.412 / MPX Power Limiting

ITU-R BS.412 requires that the average MPX power be limited to a particular standard and measured with a rolling 60-second integration time. However, since it is impossible to know what lies ahead in terms of content, loudness must be practically be controlled within a much shorter period of time “just in case.”

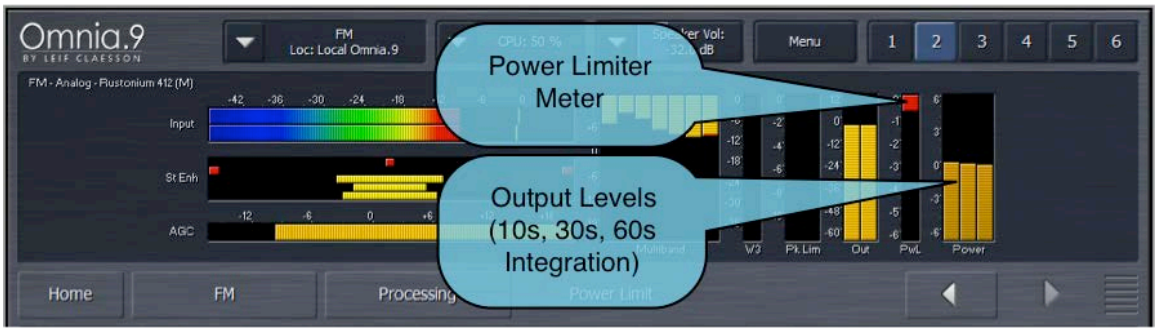
The factory “412” presets included with Omnia.9 are tuned in such a way that significantly less power limiting is needed to deliver a compliant output compared to other processors. In fact, it is not at all unusual to see no gain reduction on the Power Limiter meter at all during normal programming and only 2dB - 3dB with very bass-heavy material.

Speaking of bass, managing bass-heavy content presents a special challenge because of the amount of energy typically present in the lower frequencies. Most of Omnia.9’s “412” presets make use of the WB AGC2 or WB AGC3 compressors in “Bass Only” mode. This allows the initial portion of the bass waveform to be managed by the clipper while the remainder is processed by the compressor, resulting in much higher levels of bass than would otherwise be possible under the limitations imposed by the regulations.

To prepare Omnia.9 to operate in compliance with ITU-R BS.412, MPX Power Control must first be enabled in the **System > System Config > Processing Cores** menu. Be sure to “Apply Config” after enabling this mode and remember that doing so will take the unit off-air temporarily.

You will notice in the FM> Processing> Load Preset Menu that the preset list has been updated to include only those specifically designed for BS.412 use. There is also an additional Power Limit menu option.

In addition, the Processing Meters display window now includes a meter for the Power Limiter and three meters showing output levels over 10 second, 30 second, and 60 second integration times.



Controls for adjusting the Power Limiter are found in the FM> Processing> Power Limit menu.

- The **Peak Limiter Drive** control sets the amount of limiting performed by the final peak limiters and has a 12dB range and is adjustable in one-quarter dB increments. These limiters are the same type used in the HD and Streaming cores and are situated *before* pre-emphasis.

- The **Power Limiter Drive** control determines the amount of limiting performed by the MPX Power Limiter with a range of 12dB adjustable in one-quarter dB increments.

- Advancing the **Punch (coupled)** slider (moving it to the right) increases the Power Limiter Drive while simultaneously reducing the Peak Limiter Drive by a corresponding amount which results in a more open sound. Sliding the control to the left decreases the Power Limiter Drive and increases the Peak Limiter Drive by a corresponding amount which results in a more dense sound.

- The **Limiter Style** drop-down menu provides a choice between Standard and Aggressive settings. “Standard” is more gentle and less audible. “Aggressive” is more audible but allows you maintain levels that are closer to the designated power limit.

Chapter 11
FM Menu
RDS

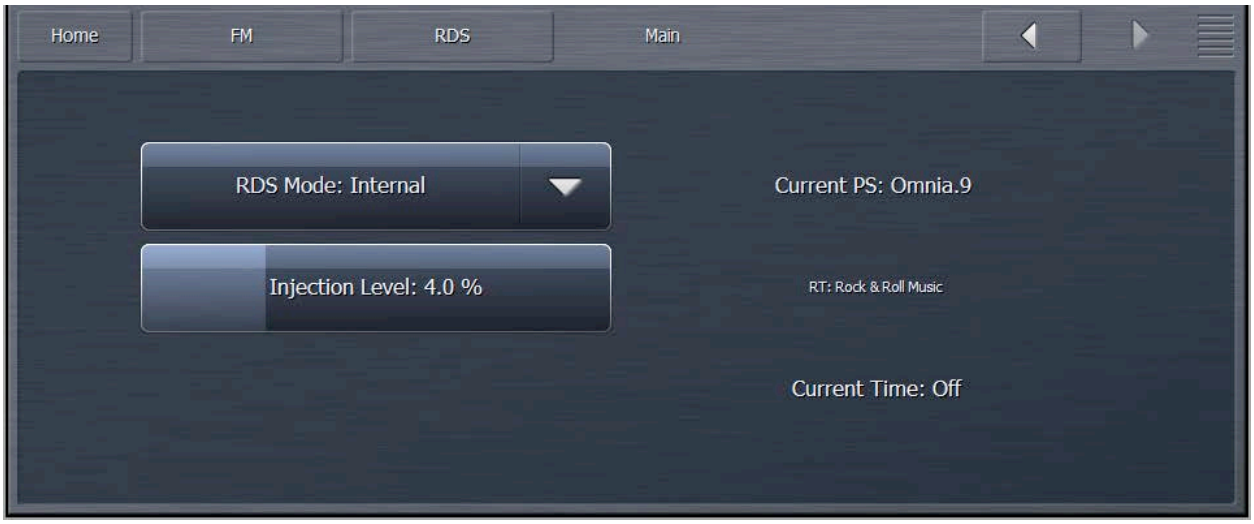
“Keep your eyes on the road, your hands upon the wheel.” - Jim Morrison

The FM Menu: RDS

The RDS control section of Omnia.9 contains the Main RDS menu, fields for Program Service (PS) and Radio Text (RT) information, program identification fields, selectable dynamic Program Type (PTY), selectable flags, and a section for selecting alternative frequencies.

RDS Main Menu

The **Main** menu controls allow you to enable RDS, choose the mode in which it operates, and set the injection level.



- The **Injection Level** slider sets the amount of RDS injection from 0 – 15%. The default setting is 4%.
- The **RDS Mode** drop-down menu allows you to choose from several different RDS options.

- When set to Off 54.5kHz, RDS is turned completely off but the audio extends all the way out to 54.5kHz. It is not recommended to use an external RDS encoder in this mode, even one installed after Omnia.9, as the audio extends partially into the portion of the spectrum normally reserved for RDS.

- When set to Off 54kHz, the audio extends only to 54kHz to allow room for RDS data provided by an external RDS encoder located after Omnia.9. Note that using this mode does mean losing 3dB of stereo separation between 16,000 and 16,500Hz.

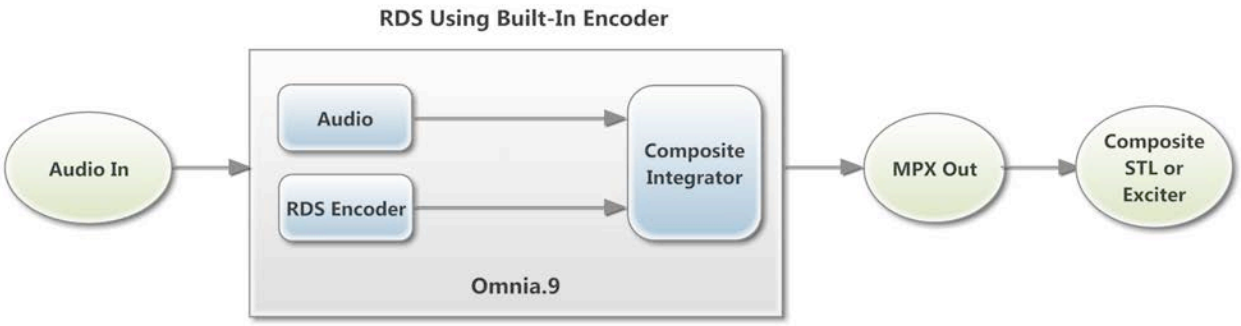
- In the Internal mode, Omnia.9's built-in RDS encoder is active. Because RDS is taken into consideration by the composite clipper, there is no loss of loudness with this mode. Therefore, we highly recommend using the Internal mode whenever possible.

- The External Input 1, External Input 2, and External Input 1+2 modes determine which of Omnia.9's MPX inputs are active for RDS input when using an external encoder.

- The **MPX 2 Output Mode** drop-down menu allows you to determine whether Omnia.9's MPX 2 Output will feed the full MPX signal, the 19kHz pilot extracted from the MPX signal, or a unique and separately generated 19kHz pilot signal.

Using Omnia.9's Built-In RDS Encoder

Using the built-in RDS encoder is the simplest and most straight-forward means of getting RDS data on the air since everything is handled within Omnia.9 itself:

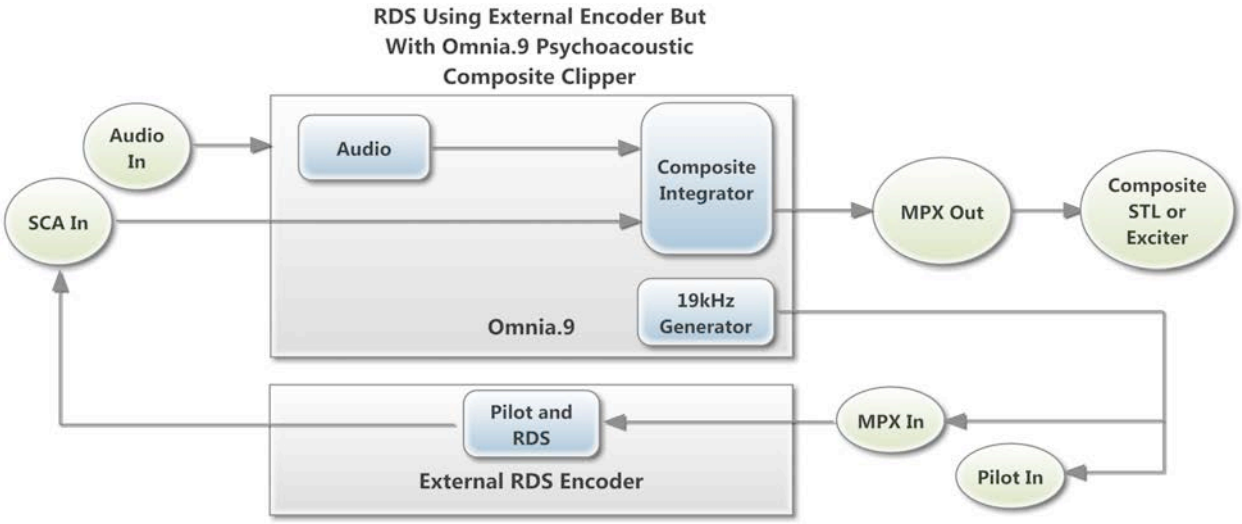


Using External RDS Encoders

If you prefer to generate RDS data externally instead of utilizing Omnia.9's built-in encoder (or your situation dictates that you do) there are various options available for nearly every hardware and software encoder available. Some common scenarios are outlined below, with details about how to set Omnia.9's various RDS controls for each situation.

Using an RDS Encoder with Omnia.9's Psychoacoustic Composite Clipper

It is possible to utilize an external RDS encoder without losing any loudness by integrating it with Omnia.9's composite clipper. To do so, you must feed both the encoder's MPX and Pilot inputs with an independently-generated 19kHz signal and in turn feed the output of the encoder (with RDS and Pilot) to one of Omnia.9's MPX inputs. Omnia.9's MPX 1 Output will feed the exciter directly.

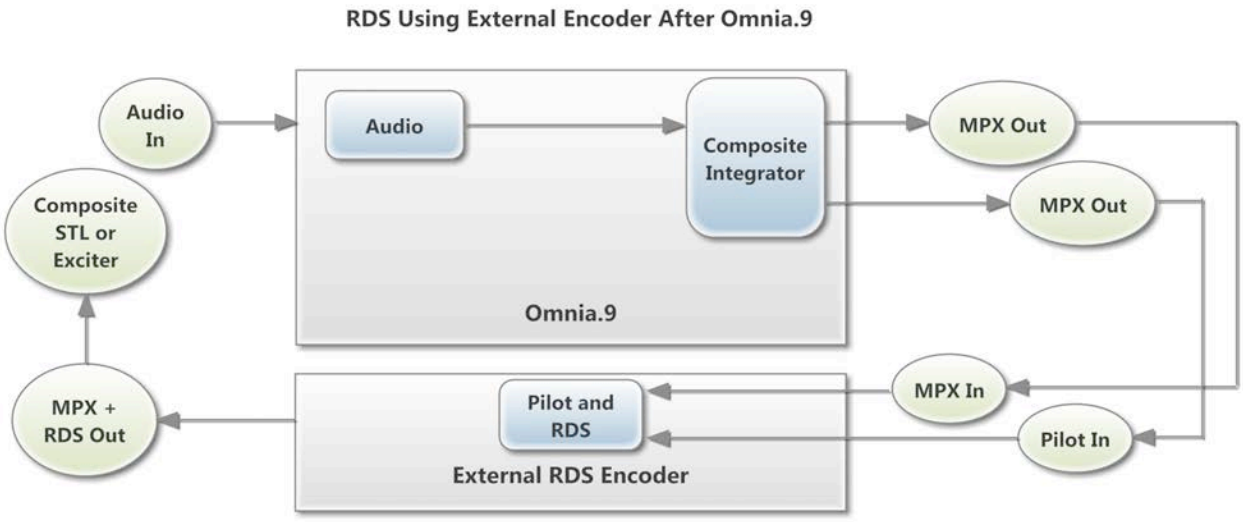


Be sure to enable the proper MPX input for RDS use (Input 1 or Input 2) in the RDS Mode menu, and set the MPX 2 Output control to the 19kHz Generator mode. The MPX 2 Output control can be found in the RDS Menu, the FM Processing Output menu, and in the main I/O menu.

As an aside, it's interesting to note that Omnia.9 filters the external RDS so tightly that if you connected the MPX output of a tuner monitoring a completely different station, it will broadcast that station's pilot and RDS data!

Using an RDS Encoder After Omnia.9

You can also use an RDS encoder after Omnia.9, but doing so means losing loudness since Omnia.9's composite clipper cannot process the fully encoded signal. In this case, Omnia.9's MPX1 Output will feed the encoder's MPX Input while the MPX 2 Output will feed the Pilot Input (Sync) of the external encoder. The output of the encoder will then feed the composite STL or exciter. In this scenario, the MPX 2 Output control should be set to the MPX Pilot mode.

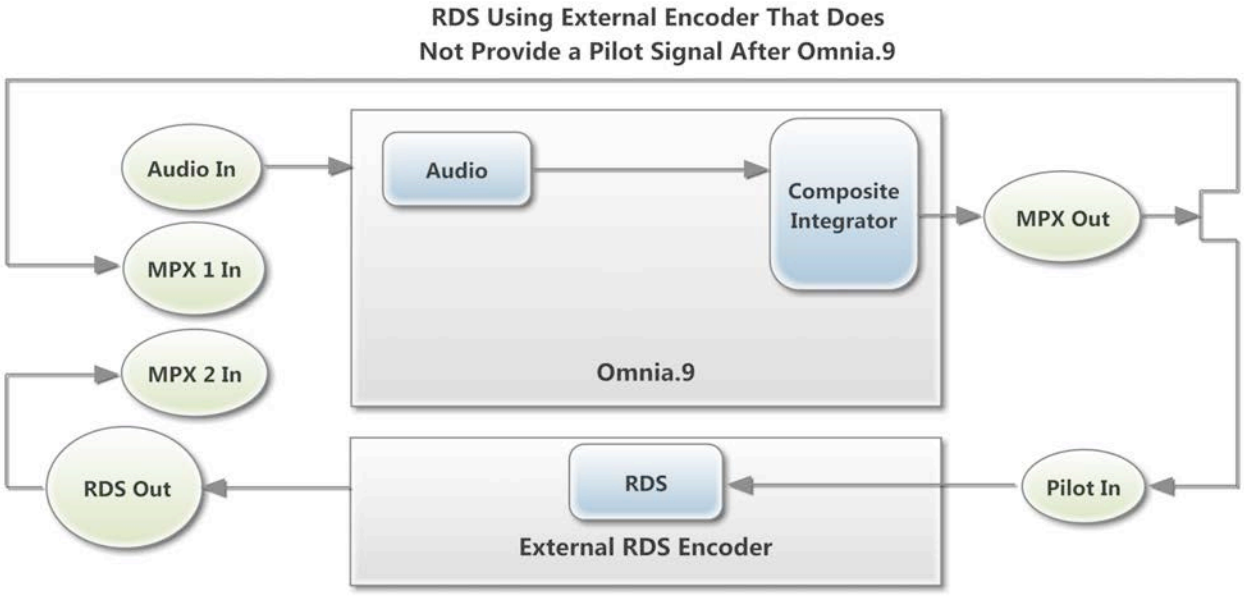


Using an RDS Encoder That Does Not Provide a Pilot Signal

Some RDS encoders take the pilot signal of the processor, use it as a sync reference for RDS, and then output only the RDS data without passing the pilot.

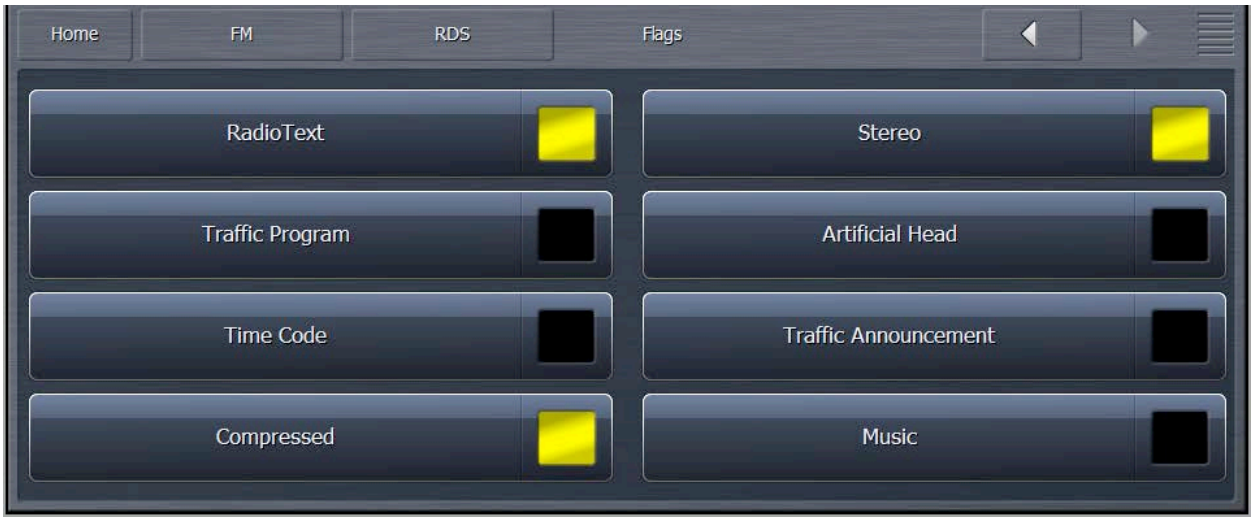
To do so, you can use a T-connector on Omnia.9's MPX 2 Output, connect one leg of the tee to the Pilot Input (Sync) on the RDS encoder, and connect the other to one Omnia.9's MPX 1 Input. The output of the RDS encoder should be connected to Omnia.9's MPX 2 Input.

In this scenario, set the MPX 2 Output control to the 19kHz Generator mode and the External Input to the 1+2 mode in so that both MPX inputs are enabled for RDS.



Flags Menu

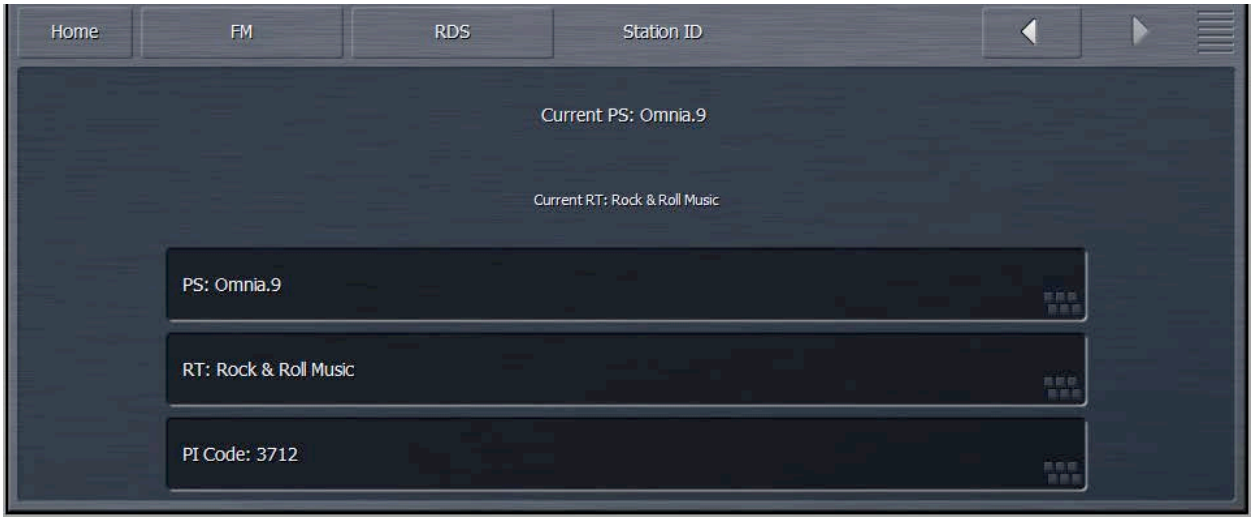
The **Flags** Menu offers enable/disable controls for the Radio Text, Traffic Program, Time Code, Compressed, Stereo, Artificial Head, Traffic Announcement, and Music flags.
When enabled, the Radio Text (RT) flag allows whatever is programmed into the RT field to be transmitted.



- The **Traffic Program (TP)** flag, when enabled, allows listeners to find only stations that regularly broadcast traffic bulletins.
- When enabled, the T**ime Code (CT)** flag allows time and date information within the RDS data to appear on the listener's receiver.
- The **Compressed** decoder information control, when enabled, indicates that the audio has been processed.
- The **Stereo** decoder information control, when enabled, identifies the station as broadcasting in stereo (as opposed to mono).
- When enabled, the **Artificial Head** decoder information control indicates the use of a binaural microphone.
- The **Traffic Announcement (TA)** flag, when enabled, can stop the playback of other media (a CD, for example) and tune in a broadcast station instead when a traffic bulletin is received. Turning the Traffic flag on and off could be automated through a request to Omnia.9's built-in http server.
- When enabled, the **Music** decoder information control identifies the station as one which broadcasts primarily music content (as opposed to speech) which in turns allows the receiver to choose between the volume levels for each type of content. Turning this flag on and off could also be automated through a request to the http server.

Station ID Menu

The **Station ID** Menu provides fields for entering Program Service (PS) and Radio Text (RT) information as well as the Program Information (PI) Code.



Typically, the **PS field** – an 8-character static display – contains the call letters of the station – for example. WOMN-FM. However, it is possible to program the PS field in such a way that it can provide a bit more information. Here are some ways to creatively use the PS field:

By splitting text with the "/" symbol, each text will alternate for 3 seconds. (WOMN-FM/88.5 FM/NOW WITH/OMNIA.9) or (WOMN-FM/TODAYS/HOTTEST/HITS)

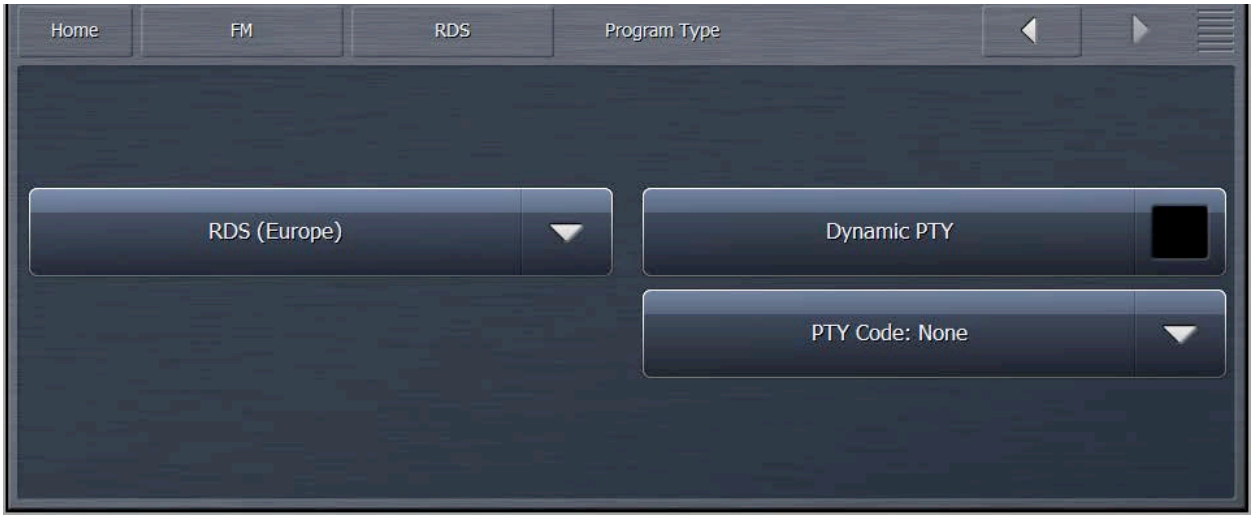
To change the amount of time the text is displayed, put the desired time in front of the text in seconds (1.5s:WOMN-FM/3.0s:88.5 FM/1.5s:OMNIA.9). In this example, "WOMN-FM" will be displayed for 1.5 seconds, "88.5 FM" will be displayed for 3 seconds, and "OMNIA.9" will appear for 1.5 seconds.

The **RT field** provides a 64-character free-form message. It can be static to provide a station slogan, or dynamic and in sync with station programming to provide song titles and artist information. Dynamic updating is accomplished via the HTTP automation interface.

The **Program Identification** field should contain the PI code unique to your station.

Program Type Menu

The **Program Type** Menu allows you to choose the RDS mode (USA or Europe), enable Dynamic Program Type, (PTY), and choose a PTY code.



When enabled, **Dynamic PTY** indicates to listeners that the type of programming on your station may change periodically. This would be useful for a station that for example broadcasts music during the week, but airs sports programming on the weekends.

The **PTY Code** drop-down menu provides you with a choice of 31 Program Type categories when using a Static Program Type.

Alternative Frequencies Menus

If you broadcast the same programming on more than one frequency, you can take advantage of an RDS receiver's ability to search for and tune into up to 16 alternative frequencies when the signal of the current frequency weakens. The Alternative Frequencies 1 & 2 menus allow you to specify those frequencies.

Chapter 12
FM Menu
MPX Inputs

So many possibilities from two modest BNC jacks.

The FM Menu: MPX Input

Omnia.9 provides two rear-panel MPX (composite) inputs which can be used for a variety of purposes, including using an external RDS encoder as described in the previous section on RDS. If these MPX inputs are enabled (as described in the System Config Menu section of the chapter on the System Menu), they can also be used to put some of Omnia.9's built-in tools to good use.

For example, you may wish to connect a modulation monitor or a tuner with an MPX output to one of the inputs and take a closer look at other signals in your market on the oscilloscope or spectrum analyzer. You could feed the composite output of your existing processor into the Omnia.9 to check its performance. Or, you could verify the performance of an external stereo coder that you're planning to use with the Omnia.9's L/R Output path and compare it to the performance of Omnia.9's built-in stereo coder.

MPX Inputs 1 and 2 are available as patch points which can be viewed on any of Omnia.9's instrumentations as well as auditioned through the monitor outputs using the built-in phase linear reference quality stereo decoder.

The MPX Input Menu contains additional menus for MPX Input 1, MPX Input 2, Pre-emph Input, and Display Settings.

MPX Input 1 and MPX Input 2 Menus

The **MPX Input 1** and **MPX Input 2** menus contain the controls to set the input gain, choose a pre-emphasis level, add delay, compensate for tilt, and add equalization.

- The **Input Gain** slider sets the input level of each of the two MPX Inputs in a range from -12dB to +18dB in one-tenth dB increments.

- The **Pre-emphasis** setting controls the de-emphasis circuit used when the MPX Input patch point needs to be de-emphasized, such as would be the case when it is selected as the source in a monitor input or if Left De-mod is selected when viewing the patch point in an oscilloscope display window. Typically, this should be set to match the pre-emphasis of the input signal, either 50 or 75us.

- The **Add Delay** control allows you to delay the audio coming in from the external MPX Input to match that of the Omnia.9.

- Since the outputs of most modulation monitors and tuners have some tilt present, controls to adjust compensate for **Tilt Amount** and **Tilt Coefficient** are provided. To get a good square wave reference, tune in a station with bass-heavy programming and heavy processing for visual flatness on the oscilloscope. You can also tune in your own station to verify STL and exciter performance.

- The **PEQ** button enables the 2-band parametric equalizer. When the PEQ is enabled, the sliders to adjust **center frequency**, **width**, and **gain** are available to make any necessary adjustments.

- The PEQ can be set to be phase linear, phase forward, or phase reverse via the **Phase** drop-down menu below the gain slider. The most likely mode will be phase forward to match an analog filter inaccuracy, but phase linear may be the preferred choice to counter a digital filter. If you have an exciter that you know to be perfectly accurate (such as a direct-digital-synthesis exciter) but a receiver that is not, you can use Omnia.9's MPX test tone generator in conjunction with the MPX Input PEQ to equalize the high frequency response of your receiver to achieve a more accurate result.

Pre-emph Input Menu

The Pre-emph Input menu contains the controls to choose and adjust the physical input, pre-emphasis, delay, and equalization settings. The Pre-emph Input is similar to the MPX Inputs, but is specifically for use with the L/R Outputs from another processor. This input can receive audio from any of the three digital inputs. The analog input is not suitable as it is not DC coupled.

- The **Physical Input** control determines which rear-panel input is routed to the pre-emph input patch point.
- The **Source** control selects whether the input source is flat or pre-emphasized.
- The **Pre-emphasis** control should be set to match the amount of pre-emphasis the incoming signal has (or used to have if it was de-emphasized prior to being fed into Omnia.9).
- The **Add Delay** control allows you to delay the audio coming in from the pre-emphasis input to match that of the Omnia.9.
- The **PEQ** button enables the 2-band parametric equalizer. When the PEQ is enabled, the sliders to adjust center frequency, width, and gain are available to make any necessary adjustments. The PEQ can be set to be phase linear, phase forward, or phase reverse via the drop-down menu below the gain slider.

Display Settings Menu

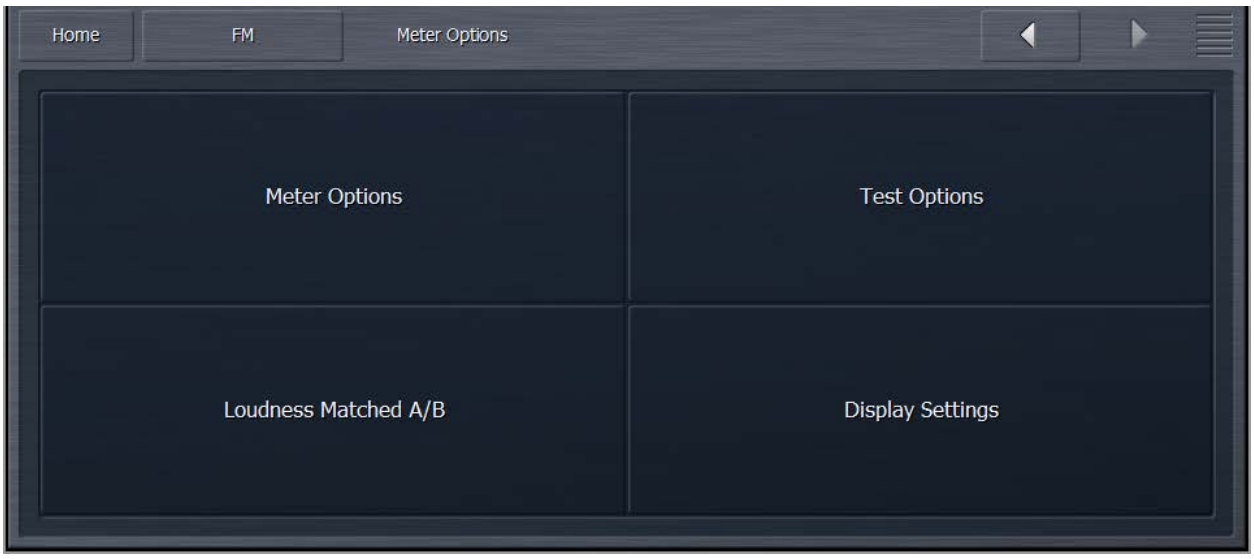
The Display Settings menu is the same menu found in the Processing Menu of the Processing section, and is duplicated here for convenience.

Chapter 13
FM Menu
Meter Options

Seeing what you hear.

The FM Menu: Meter Options

The Meter Options Menu contains sub-menus for Meter Options, Test Options, Loudness Matched A/B, and Display Settings.



Meter Options Menu

Which meters are displayed in the Loudness Meter, Modulation Meter, and Modulation Numeric display windows are determined by enabling or disabling available options in this menu.

Specifically:

- **Program Input** is available only in the in the Loudness Meter display.
- **MPX Output**, **MPX Input 1**, **MPX Input 2**, and **Pre-emph Input** are available in the Loudness Meter, Modulation Meter, and Modulation Numeric displays.
- The **MPX Power Meter**, **Peak Modulation Meter**, **Pilot Level Meter**, and **L/R Level Meter** can be added to the Modulation Meter display of any enabled MPX section, including MPX Output, MPX Input 1, and MPX Input 2.
- The **MPX Power Numeric**, **Peak Modulation Numeric**, **Pilot Level Numeric**, and **L/R Level Numeric** can be added to the Modulation Numeric display of any enabled MPX section.
- The **MPX Power Limit** control sets the center of the MPX Power meter as well as whether the numeric readout is green or red. This can be set differently from the MPX Power Limit control in the FM Processing section, and is available even when Omnia.9 is not operating in MPX Power Mode, to provide a power measurement reference.

Loudness Matched A/B Menu

The ability to compare the sound of the input audio to the processed output audio is valuable when adjusting your processing. Because the human ear often misinterprets “louder” as “better” for the first few seconds after it hears a new sound, making sure the average levels of the input and output audio closely match eliminates that distraction so that your ear can concentrate on the other changes the processor is making to the texture, dynamics, and spectral balance of the audio.

It is possible to manually adjust these levels in the Monitor Output Menu as you switch back and forth between patch points, but because input levels vary so much within and between songs, this can get tricky (or just plain annoying), throws your ear for a momentary loop, and takes your mind off the careful study of the changes you’re making to your processing.

To make A/B comparisons easier, Omnia.9 can apply automatic leveling to several key input patch points and makes those available here in the Meter Options Menu (for display purposes) as well as in each of the Monitor Outputs menus.

- ***Note:*** *This leveling function affects ONLY the audio available at the patch point. It has NO effect on the on-air processing.*

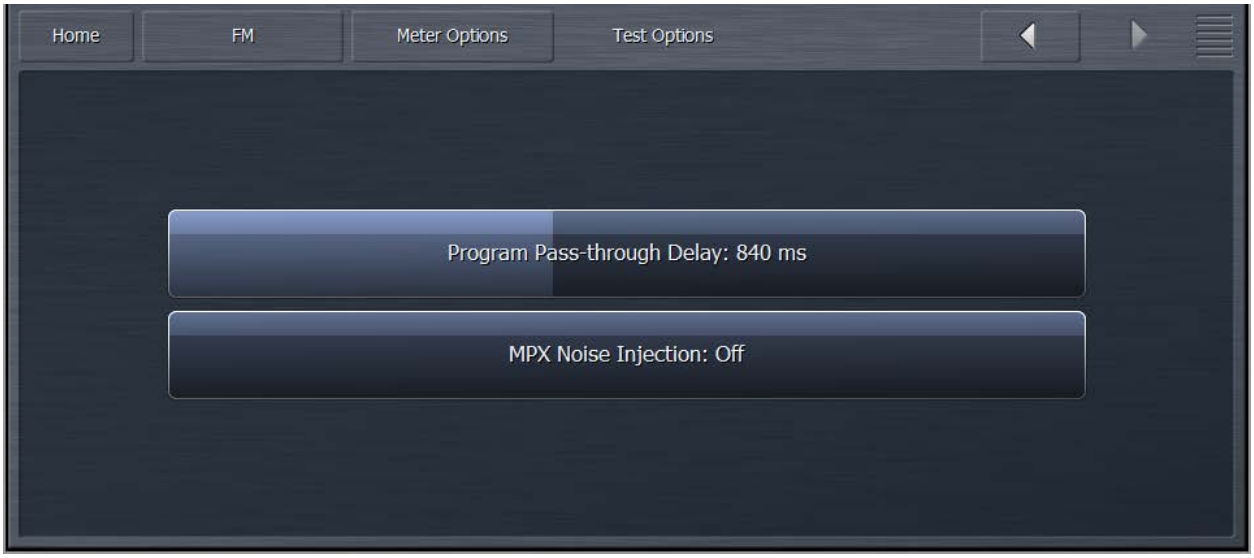
- The **Integration Time** setting controls the integration time of the two ITU BS.1770 loudness meters that form the basis for the loudness comparison. The loudness is equalized by a ramping gain to account for the difference between the two loudness meters. The default time is 1 second; 3 seconds is optional. The 1 second integration time will cause the leveler to respond to differences in level more quickly, providing more consistent levels between A and B, while the 3 second time will allow more level variation and reduces the likelihood of audible pumping.

- The **Source** control allows you to choose the audio source for the Loudness Matching patch point. Available options are Program Input, MPX Input 1, MPX Input 2, Pre-emph Input and Post Multiband.

- The **Match** control allows you to choose which audio source to match the loudness of. Available options are MPX Output, L/R Output, MPX Input 1, MPX Input 2 and Pre-emph Input.

Test Options Menu

The Test Options menu contains two controls that are useful only in a test situation, and have no effect at all on the on-air output. The Test Input patch point activates automatically and does not use processing power when inactive. Enabling the Always Active control in the Test Input menu forces this patch point to remain active at all times and allows for cleaner A/B switching.



- **MPX Noise Injection** is useful when “racing” against your competition as received through a tuner with a composite output connected to one of Omnia.9’s MPX Inputs. There is no such thing as perfect radio reception, and some noise will always be present, so this control helps “level the playing field” a bit. To use this feature, set up two FFT spectrum analyzer displays, one looking at MPX Output with Noise, and the other looking at the MPX Input. Then, using the MPX Noise Injection control, you can visibly match the noise level of the received station so that you can A/B "MPX Input" with "MPX Output with Noise" using either a monitor output or the client audio output. This allows a much more carefully controlled and accurate comparison than simply changing presets on a tuner, especially since you can have two oscilloscopes side by side displaying both signals to make sure that both are modulating at the exact same peak level.

- The **Pass-Through Delay Time** control adjusts the delay time for the pass-through patch point, which contains the original, unprocessed audio but without compensation delay. It is normally in sync with the Input, not the Output.

- ***Note:*** *If you feed the MPX signal from another processor into one of Omnia.9's MPX inputs, the pass-through patch point can be used to feed the unprocessed program audio from Omnia.9 into the other processor. This is true even when Omnia.9 is using its internal playback and regardless of which physical input is selected. The output of the other processor can be monitored through Omnia.9's Speaker or Headphone Monitor Output. The meters and controls of the other process will be in real time, without delay, as the compensation delay will be before the processor instead of after.*

Display Settings Menu

The Display Settings menu is the same menu found in the Processing Menu of the Processing section, and is duplicated here for convenience.

Chapter 14
Studio Processing Menu

“Talent is cheaper than table salt. What separates the talented individual from the successful one is a lot of hard work.” - Stephen King

The Studio Processing Menu

The Studio Processing Core is a low-latency processing core mainly designed for talent monitoring. Its menu allows you to choose the input source, load and save presets, and make changes to the Parametric Equalizer, Downward Expanders, Input AGC, Wideband AGC1, Multiband Stereo Enhancer, Multiband AGC and Limiters, Wideband AGC2, and Band Mix sections.

Processing Menu

The vast majority of the menus and controls in Omnia.9's Studio Processing core operate just as their counterparts in the FM Processing core do. A detailed explanation of each menu and control can be found and referenced in the FM Processing menu section of this manual. The exception is the Band Mix controls explained below.

- The **Band Mix Menu** contains the controls for the individual band output levels, the Final Limiter Drive, the Output Level, and an option to enable or bypass the Multiband Limiters.

- The **Band Mix (coupled)** slider allows you to adjust the output levels of all bands simultaneously. Each band can also be individually adjusted with the **Band 1 - Band 7 Level** controls. Adjustments here should be made carefully (especially additional gain) as the only processing stage following this section is the Final Limiter.

- The Studio processing core does not use a final clipper for peak control. Instead, it uses a look-ahead limiter, which is adjustable by the **Final Limiter Drive** control and operates in a range between -6.00 and +6.00dB in one-quarter dB increments. Reducing limiter drive (sliding the control to the left) reduces the amount of limiting and gives you a more open sound, but at the expense of overall loudness. Conversely, increasing limiter drive (moving the slider to the right) will result in more limiting and a louder output, but at the expense of dynamics.

- Enabling the **Multiband Limiters** provides a peak limiter to ride atop each individual band, similar to the arrangement in the FM, HD, and Studio processing cores. Disabling the limiters reduces the already low latency times in the Studio processor core slightly.

Chapter 15
HD Processing Menu

Just like processing for FM
except for how it's different.

The HD Processing Menu

The HD-1, HD-2, and HD-3 menus of Omnia.9 provide access to all sections of the HD processing core(s), depending upon configuration. From this menu, you can choose the input source, load and save presets, and make changes to the Parametric Equalizer, Downward Expanders, Input AGC, Wideband AGC1, Multiband Stereo Enhancer, Multiband AGC and Limiters, Wideband AGC2, Band Mix, Bass Clipper, and Final Limiter sections.

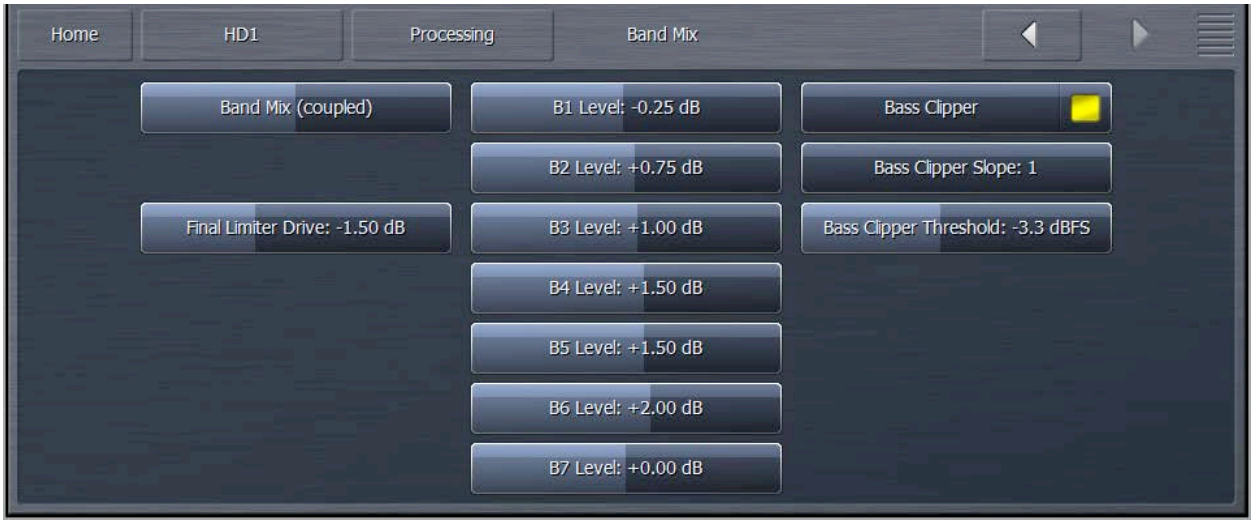
It also includes its own Meter Options menu.

The HD processing cores are suitable for use in both HD Radio (iBiquity/NRSC-5) and DAB (Eureka 147) applications depending upon the sample rate established in the System> System Config> Sample Rate menu.

Processing Menu

All processing parameters for the individual HD cores are found here. Their functions are similar to those in the FM processing core.

However, like the Studio Processing core, the HD processing cores do not use a final clipper for peak control. Instead, they use a look-ahead limiter, which is adjustable by the **Final Limiter Drive** control and operates in a range between -6.00 and +6.00dB in one-quarter dB increments. Reducing limiter drive (sliding the control to the left) reduces the amount of limiting and gives you a more open sound, but at the expense of overall loudness. Conversely, increasing limiter drive (moving the slider to the right) will result in more limiting and a louder output, but at the expense of punch.

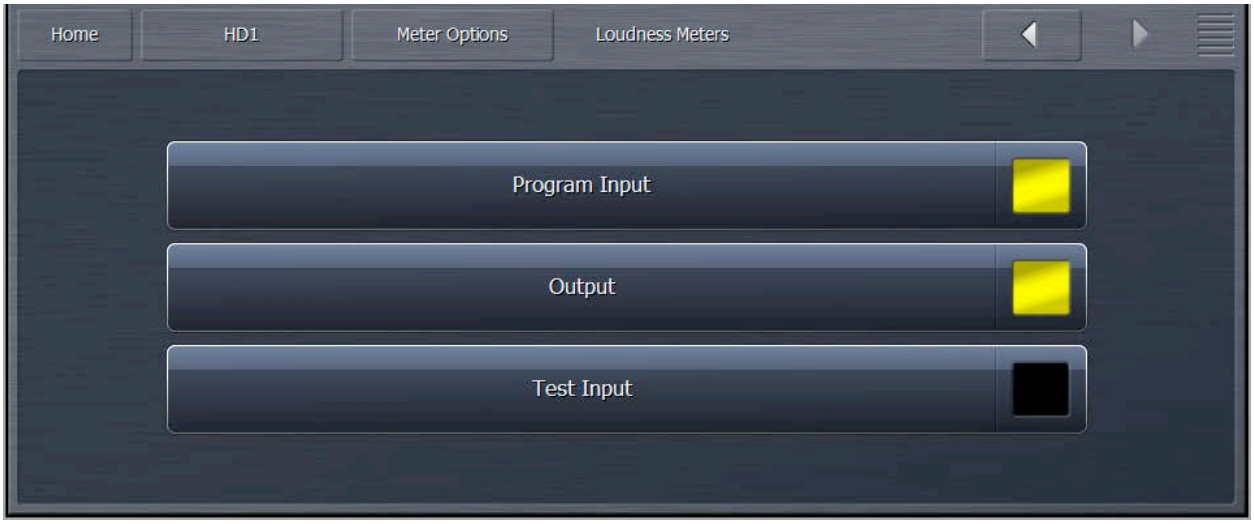


Meter Options Menu

Just as the FM section has a Meter Options menu, so does the HD section, including Loudness Meters, Loudness Matched A/B, and Test Input sub-menus which make it possible to conduct A/B comparisons with another HD processor while matching gain and delay.

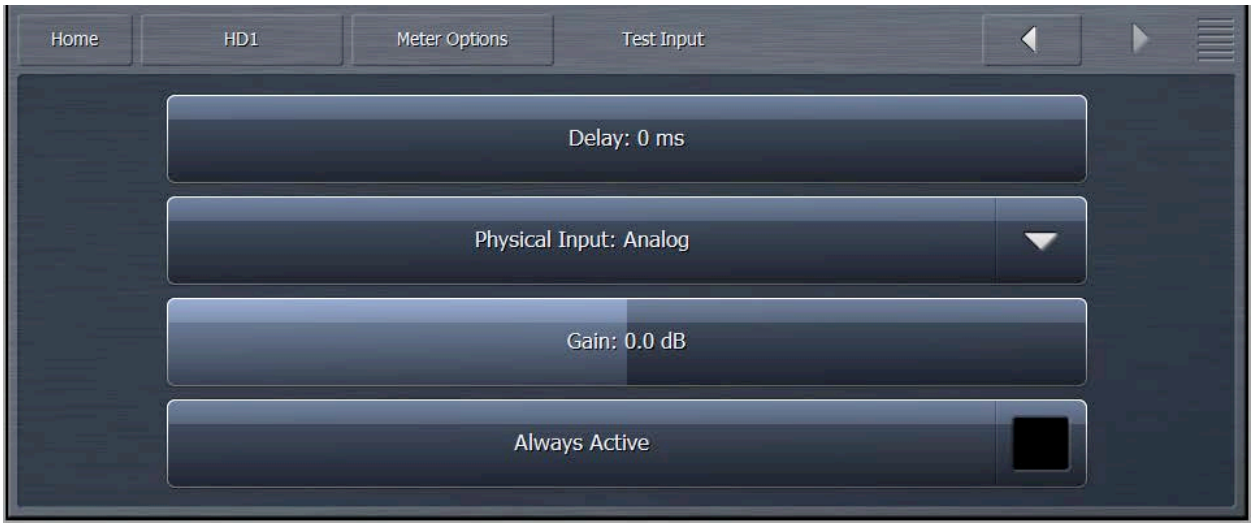
Loudness Meters Menu

The Loudness Meters Menu determines which meters are visible when the Loudness Meters are displayed. Choices include **Program Input**, **Program Output,** and **Test Input** meters.



Test Input Menu

The source audio for the Test Input is selected here along with adjustments for gain and delay time and an option for meter activity.



- The **Delay** slider provides between 0 and 10,000 ms of delay to time-align audio coming in from the Test Input.
- The **Physical Input** drop down menu determines the source of the audio feeding the Test Input, including Analog, Main Digital, AES Reference, and Aux Digital.
- The **Gain** control provides adjustment for audio feeding the Test Input.
- Enabling the **Always Active** option keeps the meter running (continuous integration) even when the Program Input and Program Output sources are not actively being monitored at their corresponding patch points.

Loudness Matched A/B Menu

Loudness matching for HD works in the same manner as the corresponding section of the FM processing core previously described in detail though the **Source** and **Match** options are different.

- **Source** audio and **Match** audio can both come from either the Program Input to the HD core or from the Test Input as selected in the Test Input Menu.

Display Settings Menu

The Display Settings menu here is similar to the one found in the FM processing section but with patch points for the HD processing cores.

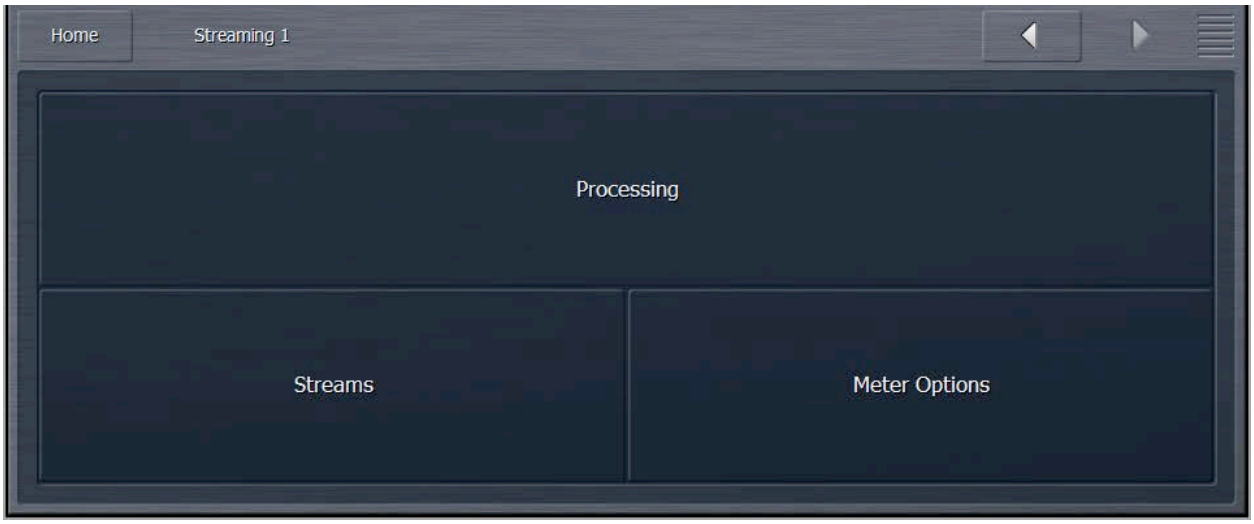
Chapter 16
Streaming Processing & Encoding Menu

No transmitter? No tower?
No problem.

The Streaming Processing & Encoding Menu

The audio for Stream 1 is shared with the FM and HD-1 sections of Omnia.9, while Streams 2 and 3 are shared with their corresponding HD-2 and HD-3. However, each stream can be processed completely independently of its corresponding HD core.

The Streaming menu for each of the Streaming 1, Streaming 2, and Streaming 3 sections contains sub-menus for processing (provided the conditions that allow for independent streaming processing as outlined above are me) and for configuring the various encoder and server options.



A detailed explanation of setting up and configuring streaming encoders and servers would require an entire manual of its own, and is beyond the scope of the general Omnia.9 manual. We have assumed that users who stream possess at least a basic knowledge of how streaming audio works and an understanding of the differences between the various formats. We encourage you to work closely with your IT administrators to obtain the information specific to your operation.

Processing Menu

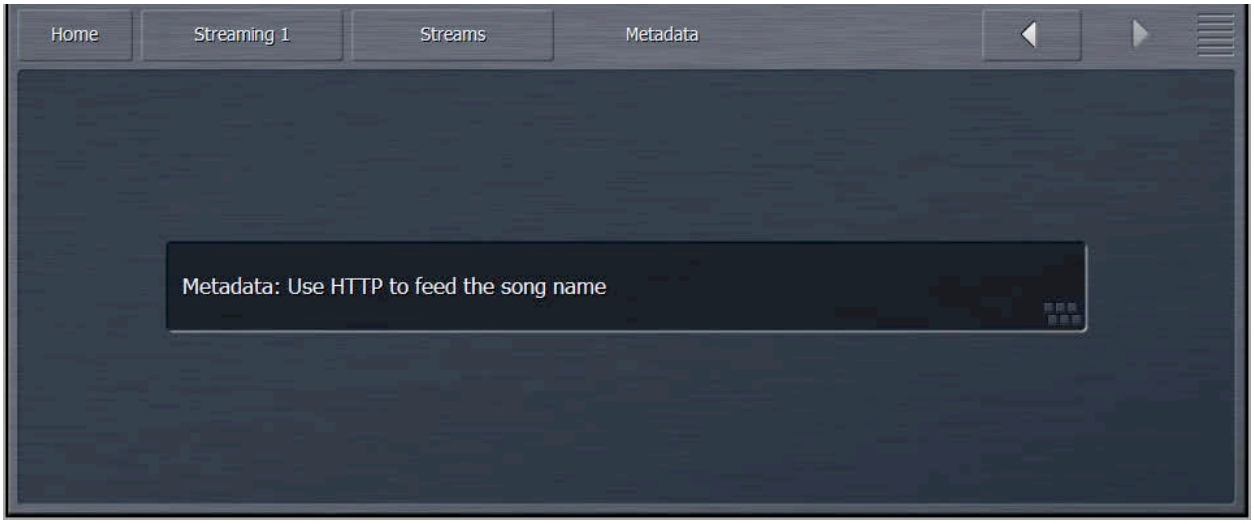
The menus and controls in each of Omnia.9's Streaming cores operate just as their counterparts in the HD Processing cores do, which in turn are very similar to their counterparts in the FM processing section. A detailed explanation of each menu and control can be found and referenced in the FM Processing menu section of this manual. Controls unique to the HD and Streaming sections are described in detail in the HD Processing menu section.

Streams Menu

This menu contains the controls necessary to set up and configure each of the enabled encoders and is where details of the servers can be entered. The type and maximum number of encoders can be set up in the the System> System Config> Streaming Encoders menu.

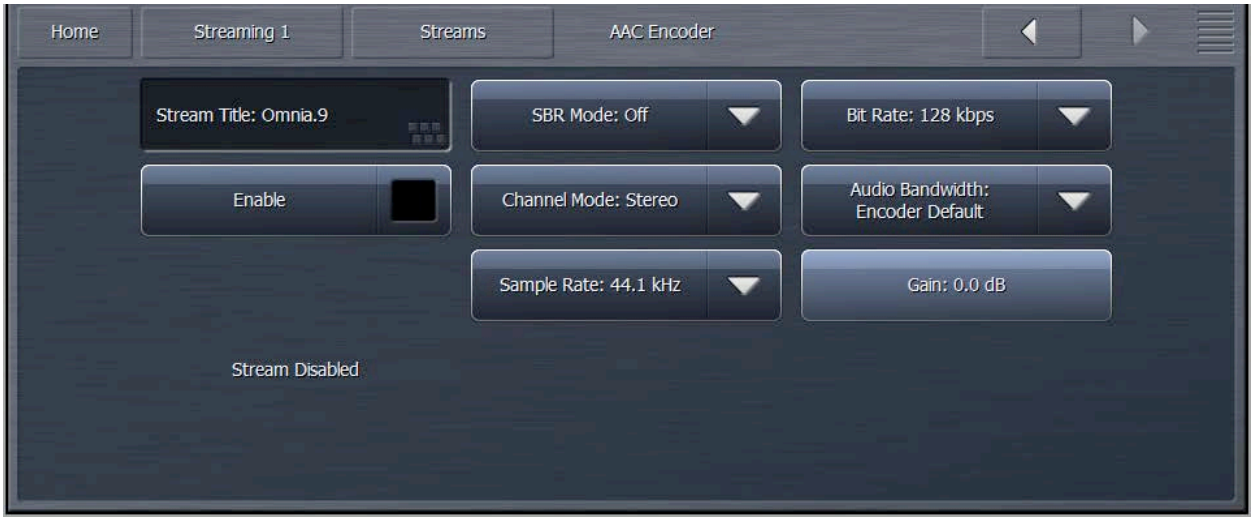
Metadata Menu

Omnia 9‘s built-in http server can be used to feed information such as the song title and artist information to the stream.



AAC Encoder Menu

The AAC Encoder menu allows you to enable or disable the stream, adjust its output gain, enter the stream's title, and select the SBR Mode, channel mode, sample rate, bit rate, and audio bandwidth.



- The **Title** field allows you to enter the stream title displayed to listeners and on public listings, such as shoutcast.com.
- The **Enable** control enables or disables the stream. When enabled, the encoder will continually try to connect to the specified server.
- The **SBR (Spectral Band Replication) Mode** toggles between Off, On, and Oversampled. We recommend setting this control to Off (AAC) for bit rates of 160kbps or higher, On (AAC+) for bit rates of 96kbps or lower, and Oversampled for bitrates between 96 and 128kbps.
- The **Channel Mode** menu provides a choice between Mono, Stereo, Stereo Independent, Parametric Stereo, and Dual Channel. We recommend setting this control to Stereo for bit rates over 40kbps and to Parametric Stereo for bit rates of 40kbps and lower. Mono should be used only if the program material is mono. Because the Stereo Independent and Dual Channel settings force the encoder to divide bits equally between the left and right channels instead of allowing it to

allocate the bits as needed, we recommend not using these settings unless you have a specific reason to do so.

- The **Bit Rate** menu allows you to choose encoding bit rates between 16kbps and 320 kbps. Your choice of bit rate settings will significantly influence the audio quality of your stream. However, you will also need to take other factors into consideration, such as the total amount of bandwidth available for the stream, the anticipated number of users, your maximum upload speed, and the download speed limits of your intended users.

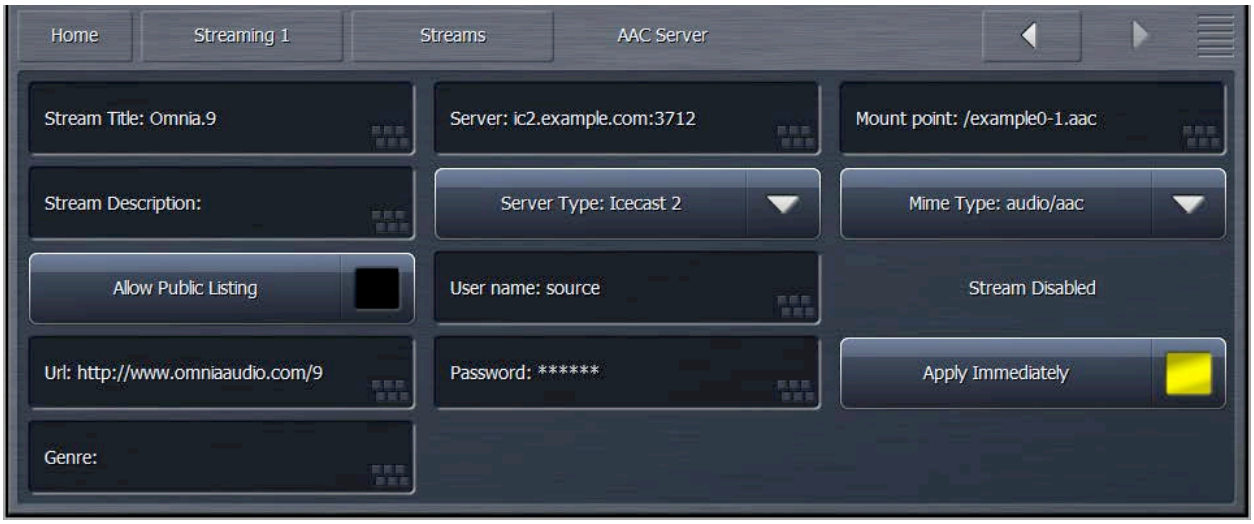
- The **Audio Bandwidth** menu allows you to set the high frequency range of the stream between 8 and 20kHz. Unless you have a specific reason to set the bandwidth manually, we strongly recommend leaving this control set to Encoder Default.

- The **Sample Rate** menu will either maintain Omnia.9's system sample rate of 44.1kHz or 48kHz (depending on the sample rate setting) in the encoder, or result in a high-quality re-sample to 32, 44.1, or 96kHz.

- The setting of the **Gain** control is critical. Normally, this control can be left at 0.0. However, there are times when you will want to reduce the input level into the encoder. For example, if you are employing a lot of peak limiting in the Streaming core and using AAC+ encoding at a low bit rate, there will be peak overshoots created as a side effect of the bit rate reduction. Unless the input level into the encoder is reduced, it will be up to the listener's decoder to deal with the excessive levels, which will most certainly degrade the quality of the audio. You may also consider backing off the Final Limiter Drive from within the Streaming processing core.

AAC Server Menu

The AAC Server menu allows you to input and set up your server settings.



- The **Title** field should contain the name of your audio stream.

- The **Server** field should contain the URL of the server, including the port, in the following format: "streamingserver.example.com:8000"

- The **Mount Point** field (for Icecast 2 servers) should contain the mount point on the server, in the following format: "/example1.mp3" following the server name.

- Enabling the **Allow Public Listing** control sets the “public listing allowed” flag in the stream, as determined by the server.
- The **Server Type** control allows you to choose between Shoutcast and Icecast2.
- The **Mime Type** control specifies the HTTP Mime Type of the stream and determines whether Audio/AAC or Audio/AACP settings are used to provide for player compatibility.
- The **URL** field is a metadata field whose information is sent to the server to be (potentially) displayed in the listings and player. The URL is typically the station’s official home page
- The **User Name** field contains the user (log-in) name for the server.
- The **Password** field contains the password for the server.
- The **Genre** field is also a metadata field. The type or style of content found on the stream is typically entered here.
- The **Apply Immediately** control determines whether any changes you make to the server settings take effect immediately or when you manually reconnect.

MP3 Encoder Menu

The MP3 Encoder menu allows you to enable or disable the stream, adjust its output gain, enter the stream’s title, and select the channel mode, sample rate, bit rate, audio bandwidth, and encoding quality.

- The **Title** field allows you to enter the stream title displayed to listeners and on public listings, such as shoutcast.com.
- The **Enable** control enables or disables the stream. When enabled, the encoder will continually try to connect to the specified server.
- The **Channel Mode** menu provides a choice between Mono, Stereo, and Stereo Independent. Because the Stereo Independent settings forces the encoder to divide bits equally between the left and right channels instead of allowing it to allocate the bits as needed, we recommend not using this settings unless you have a specific reason to do so.

- The **Sample Rate** menu will either maintain Omnia.9's system sample rate of 44.1kHz or 48kHz (depending on the sample rate setting) in the encoder, or result in a high-quality re-sample to 8, 11.025, 12, 16, 22.05, 24, 32kHz.

- The **Bit Rate** menu allows you to choose encoding bit rates between 16kbps and 320 kbps. Your choice of bit rate settings will significantly influence the audio quality of your stream. However, you will also need to take other factors into consideration, such as the total amount of bandwidth available for the stream, the anticipated number of users, your maximum upload speed, and the download speed limits of your intended users.

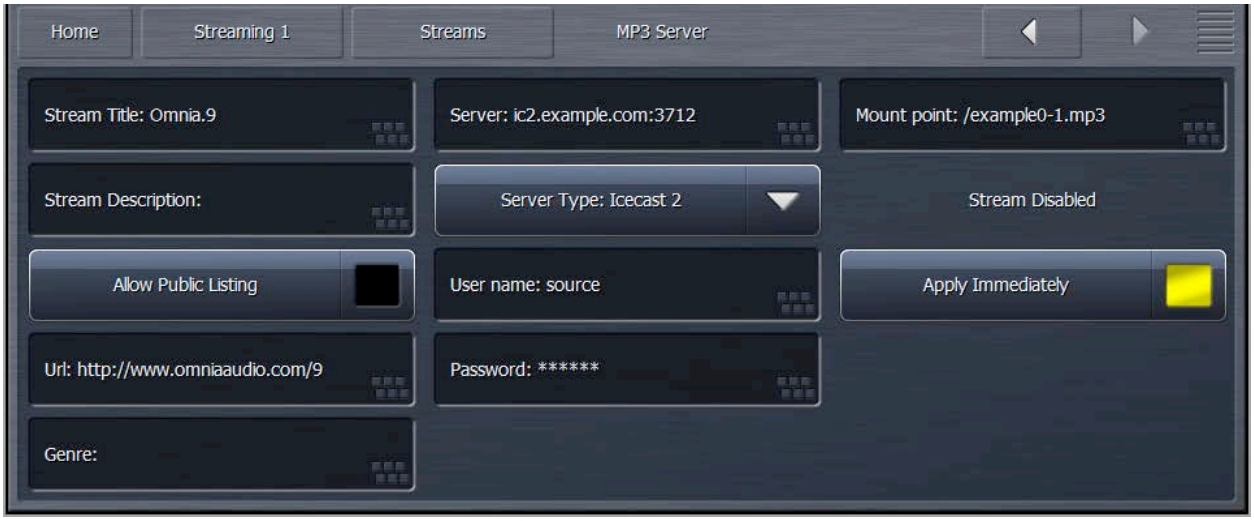
- The **Audio Bandwidth** menu allows you to set the high frequency range of the stream between 3 and 20kHZ. Unless you have a specific reason to set the bandwidth manually, we strongly recommend leaving this control set to Encoder Default.

- The **Encoding Quality** menu provides a choice between Best, Normal, and Low CPU which allows you to balance the tradeoff between higher audio quality and lower CPU usage.

- The **Gain** control determines the final output level into the encoder. If you are encoding to a low bit or sample rate, you will almost certainly need to turn this down to prevent harsh crackling sounds resulting from clipping in the receiving decoder.

MP3 Server Menu

The MP3 Server menu allows you to input and set up your server settings.



- The **Title** field allows you to enter the name of the encoder.

- The **Server** field should contain the URL of the server, including the port, in the following format: "streamingserver.example.com:8000"

- The **Mount Point** field (for Icecast 2 servers) should contain the mount point on the server, in the following format: "/example1.mp3" following the server name.

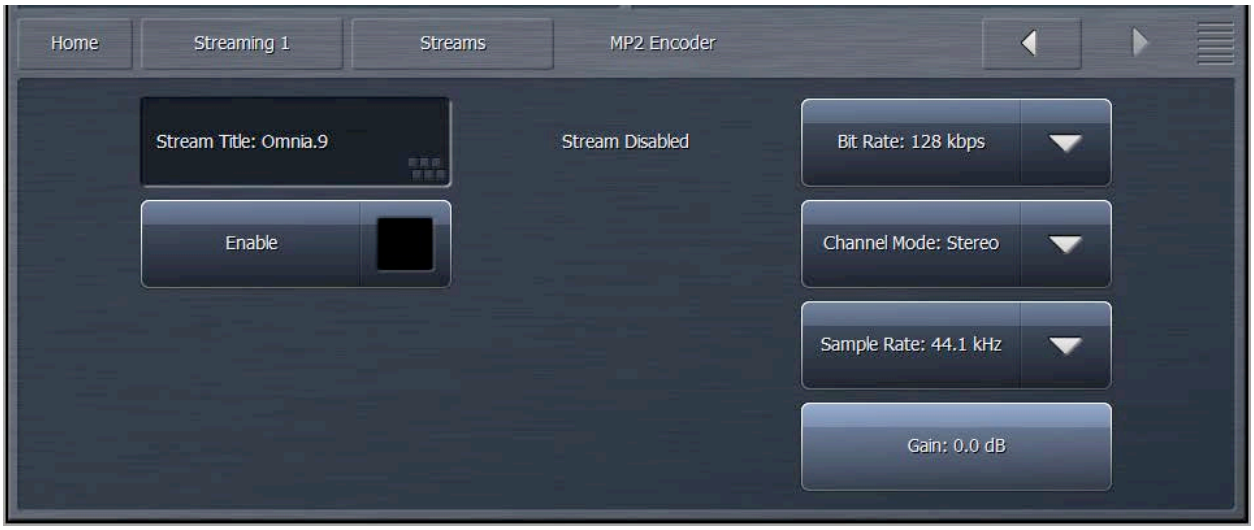
- Enabling the **Allow Public Listing** control sets the "public listing allowed" flag in the stream, as determined by the server.

- The **Server Type** control allows you to choose between Shoutcast and Icecast2.

- The **URL** field is a metadata field whose information is sent to the server to be (potentially) displayed in the listings and player. The URL is typically the station's official home page.
- The **User Name** field contains the user (log-in) name for the server.
- The **Password** field contains the password for the server.
- The **Genre** field is also a metadata field. The type or style of content found on the stream is typically entered here.
- The **Apply Immediately** control determines whether any changes you make to the server settings take effect immediately or when you manually reconnect.

MP2 Encoder Menu

The MP2 Encoder menu allows you to enable or disable the stream, adjust its output gain, enter the stream's title, and select the channel mode, sample rate, and bit rate.

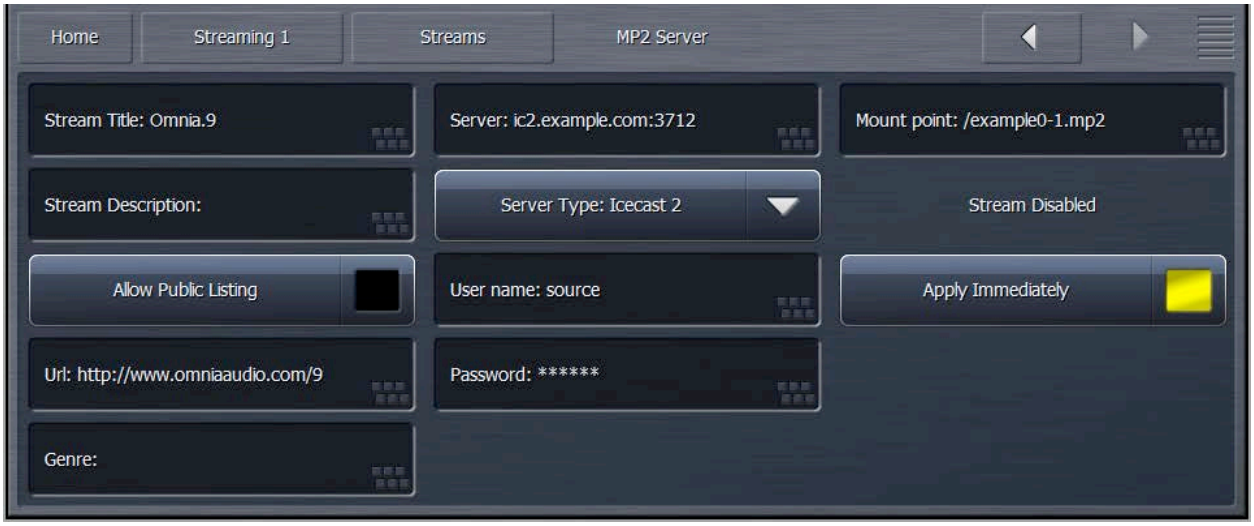


- The **Title** field allows you to enter the stream title displayed to listeners and on public listings, such as shoutcast.com.
- The **Enable** control enables or disables the stream. When enabled, the encoder will continually try to connect to the specified server.
- The **Channel Mode** menu provides a choice between Mono, Stereo, Joint Stereo, and Dual Channel.
- The **Bit Rate** menu allows you to choose encoding bit rates between 64kbps and 384kbps. Your choice of bit rate settings will significantly influence the audio quality of your stream. However, you will also need to take other factors into consideration, such as the total amount of bandwidth available for the stream, the anticipated number of users, your maximum upload speed, and the download speed limits of your intended users.
- The **Sample Rate** menu will either maintain Omnia.9's system sample rate of 44.1kHz or 48kHz (depending on the sample rate setting) in the encoder, or result in a high-quality re-sample to 8, 11.025, 12, 16, 22.05, 24, 32kHz.

- The **Gain** control determines the final output level into the encoder.

MP2 Server Menu

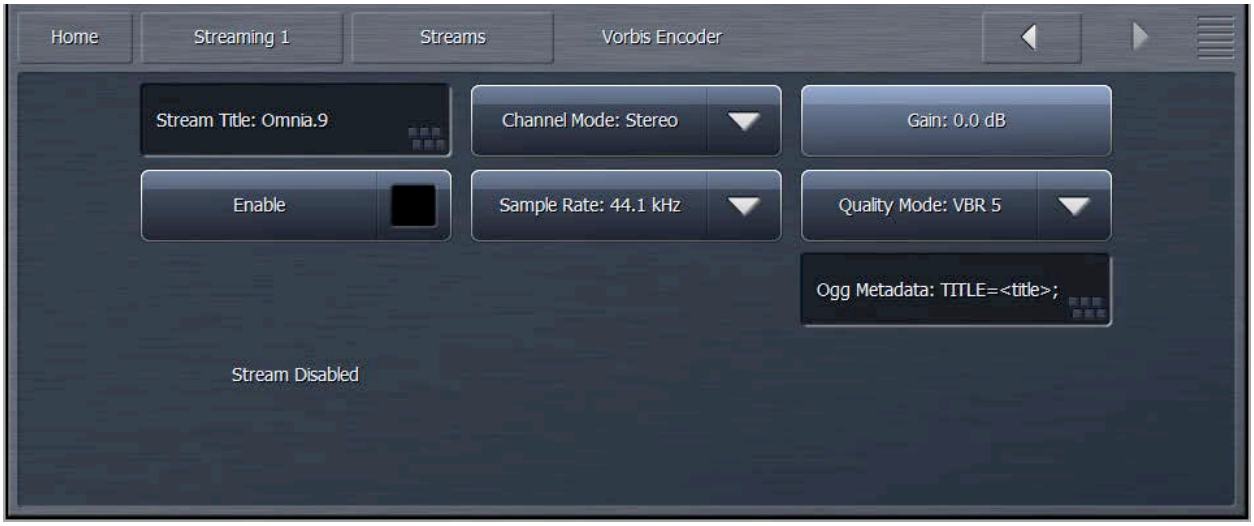
The MP2 Server menu allows you to input and set up your server settings.



- The **Title** field allows you to enter the stream title displayed to listeners and on public listings, such as shoutcast.com.
- The **Server** field should contain the URL of the server, including the port, in the following format: “streamingserver.example.com:8000”
- The **Mount Point** field (for Icecast 2 servers) should contain the mount point on the server, in the following format: “/example1.mp3” following the server name.
- Enabling the **Allow Public Listing** control sets the “public listing allowed” flag in the stream, as determined by the server.
- The **Server Type** control allows you to choose between Shoutcast and Icecast2.
- The **URL** field is a metadata field whose information is sent to the server to be (potentially) displayed in the listings and player. The URL is typically the station’s official home page.
- The **User Name** field contains the user (log-in) name for the server.
- The **Password** field contains the password for the server.
- The **Genre** field is also a metadata field. The type or style of content found on the stream is typically entered here.
- The **Apply Immediately** control determines whether any changes you make to the server settings take effect immediately or when you manually reconnect.

Vorbis Encoder Menu

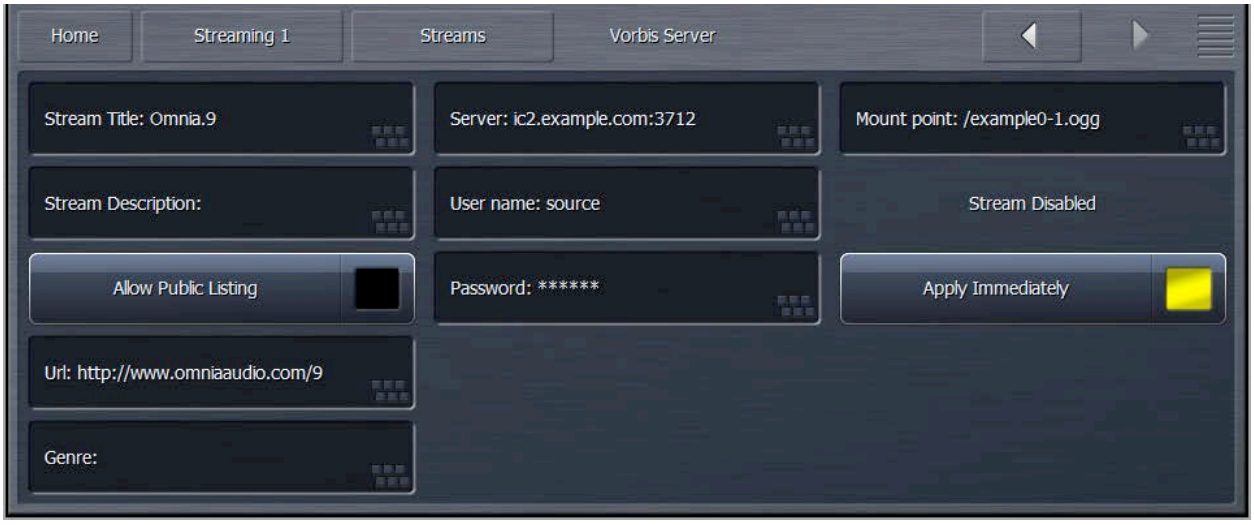
The Vorbis encoder menu allows you to enable or disable the stream, adjust its output gain, enter the stream’s title and Ogg Metadata, and select the channel mode, sample rate, and quality mode.



- The **Title** field allows you to enter the stream title displayed to listeners and on public listings, such as shoutcast.com.
- The **Enable** control enables or disables the stream. When enabled, the encoder will continually try to connect to the specified server.
- The **Channel Mode** menu provides a choice between Mono and Stereo.
- The **Sample Rate** menu will either maintain Omnia.9's sample rate of 44.1kHz or 48kHz (depending on the sample rate setting)in the encoder, or result in a high-quality re-sample to 8, 11.025, 16, 22.05, 24, 32, or 44.1kHz.
- The **Quality Mode** menu allows you to choose from a range of settings between VBR -2 and VBR 9. The Vorbis codec is by nature a variable bit rate encoder, but for reference, we have included an approximate average bit rate for quality modes lower than VBR 4.
- The **Gain** control determines the final output level into the encoder.

Vorbis Server Menu

The Vorbis Server menu allows you to input and set up your server settings.



- The **Title** field allows you to enter the name of your audio stream.
- The **Server** field should contain the URL of the server, including the port, in the following format: “streamingserver.example.com:8000”
- The **Mount Point** field (for Icecast 2 servers) should contain the mount point on the server, in the following format: “/example1.mp3” following the server name.
- Enabling the **Allow Public Listing** control sets the “public listing allowed” flag in the stream, as determined by the server.
- The **URL** field is a metadata field whose information is sent to the server to be (potentially) displayed in the listings and player. The URL is typically the station’s official home page.
- The **User Name** field contains the user (log-in) name for the server.
- The **Password** field contains the password for the server.
- The **Genre** field is also a metadata field. The type or style of content found on the stream is typically entered here.
- The **Apply Immediately** control determines whether any changes you make to the server settings take effect immediately.

WMA Encoder Menu

The WMA (Windows Media Audio) encoder menu allows you to enable or disable the stream, adjust its output gain, enter the stream’s title, and select the encoder type and format.

- The **Title** field allows you to enter the name of the encoder.
- The **Enable** control enables or disables the stream. When enabled, the encoder will continually try to connect to the specified server.
- The **Encoder** menu lets you choose between Windows Media Audio 9 and Windows Media Audio 9 Professional
- The **Format** menu allows you to choose a combination of bit rates and sample rates to determine the quality of the audio stream.
- The **Gain** control determines the final output level of the encoder.

WMA Server Menu

The WMA Server menu allows you to input and set up your server settings.

- The **Title** field allows you to enter the name of your audio stream.
- The **Genre** field is also a metadata field. The type or style of content found on the stream is typically entered here.

- The **Pull Port** field allows you to enter the server's port number.
- The **Max Pull Clients** control lets you set the maximum number of pull clients. We strongly recommend against letting listeners through directly without a server in between.
- The **Push** control enables or disables push capabilities outward toward the server, much like Icecast or Shoutcast. When enabled, fields for providing the Push URL, Template, User Name, and Password are accessible. Note that the mount point must be part of the server push URL - for example, http://omniaaudio.com/mountpoint

Meter Options Menu

Just as the FM and HD sections have a Meter Options menu, so does the Streaming section, including Loudness Meters, Loudness Matched A/B, and Test Input sub-menus which make it possible to conduct A/B comparisons with another processor while matching gain and delay. Controls are explained in detail in HD section.

Chapter 17
Monitor Output Menu

Q: If blissfully clean audio reaches the transmitter but you can't hear it in the studio, does it make a sound?

A: Yes, but you're really missing out.

The Monitor Output Menu

The Monitor Output menu of Omnia.9 allows you to independently configure the Speaker Output, Headphone Output, and Auxiliary Output. The menus and controls for each of these sections are identical.

From this menu, you can choose which of Omnia.9's processing cores you wish to monitor, and from within each core, which specific patch point.

In addition, you can Load and Save presets, adjust overall volume levels and individual left and right channel levels, access the built-in pink noise generators, independently delay the output of the left and right channels, solo the left and right channels, invert the phase of each channel, couple and un-couple the left and right channels for delay and EQ, set the frequency of the high pass filter, set the Bass Clip and Limiter thresholds, and access the loudness and parametric equalizer sections.

Keep in mind that although some of the features, terms, and tools in the Monitor Output sections are similar or identical to their counterparts in Omnia.9's various processing cores, such as the term "preset," they have no impact on the air. Monitor Outputs only control what you hear through the Speaker , Headphone, or Aux outputs.

Patch Points Menu

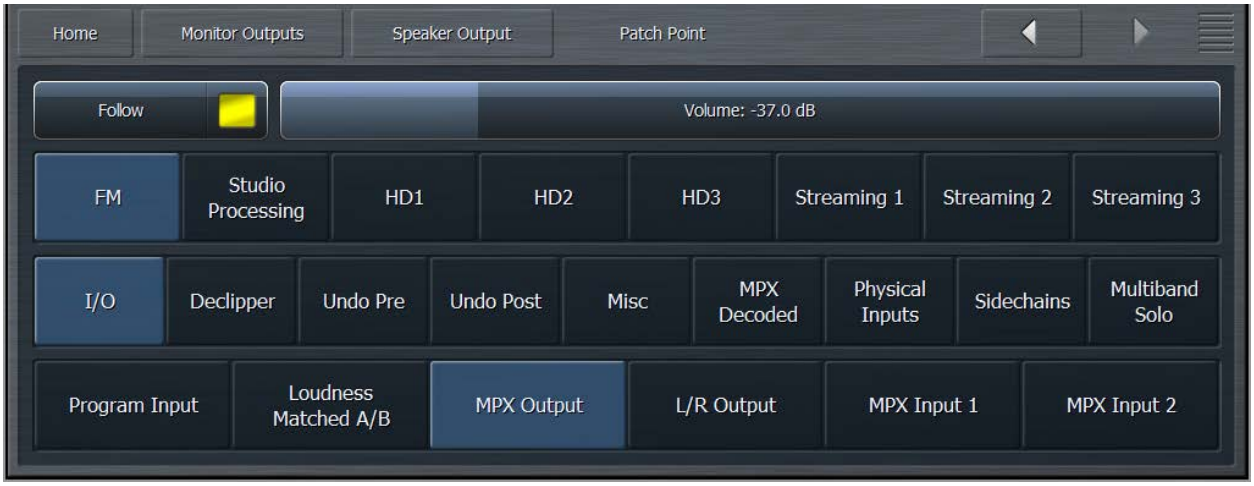
The Patch Point menu lets you choose which of Omnia.9's processing cores you wish to monitor in the Speaker, Headphone, and Aux outputs, and more specifically, which point within that core you want to hear. The patch point currently being monitored appears in the corresponding volume control at the top of the screen.

In a typical radio station scenario, the Speaker Output might be used to feed the control room monitors and the Headphone Output might be used to feed talent headphones. Each situation and application will be different, and the choice of how to utilize the monitor outputs is up to you.

One important feature to understand well is the Follow control, which is set to "Off" by default. When Follow is enabled in a particular user interface on a particular Monitor Output, the patch point (source audio) of that Monitor Output will conveniently "follow" along with you as you navigate to different processing cores in that user interface. Keep in mind that anyone else listening to that same Monitor Output will also be affected. The On/Off status of Follow is independently associated with each remote connection (or the front panel).

FM Processing Patch Points

You can feed each of the three Monitor Outputs audio from various points within the FM processing core.



- The **I/O** menu lets you listen to Program Input, Loudness Matched A/B, MPX Output, and L/R Output of the FM processing core. Additionally, both MPX Input 1 and 2 can be monitored. Note that only those processing cores that have been enabled will be available.
- The **De-clipper** menu lets you hear audio either before or after the de-clipper.
- The **Undo Pre** menu lets you listen to the audio of each individual Undo band before it enters the de-clipper and multiband expander. The available number of bands is determined by the current processing preset.
- The **Undo Post** menu lets you listen to output of the entire Undo section, or to the output of each individual Undo band before it enters the main audio processing core.

- The **Miscellaneous** menu lets you listen to the audio after Input Filtering, after Multiband processing, after the Bass Clipper, after the Loudness Matched input, as an MPX signal with noise, or at the Program Pass-through patch point.
- The **MPX Decoded** menu allows you to listen to decoded (pre-emphasized/de-emphasized) audio from the MPX Output, MPX Input 1, or MPX Input 2.
- The **Multiband DRC Solo** menu lets you listen to the audio after the Parametric EQ, in each of the AGC, Wideband 1, and Wideband 2 sidechains, and at the output of each individual band of the Multiband processing section.

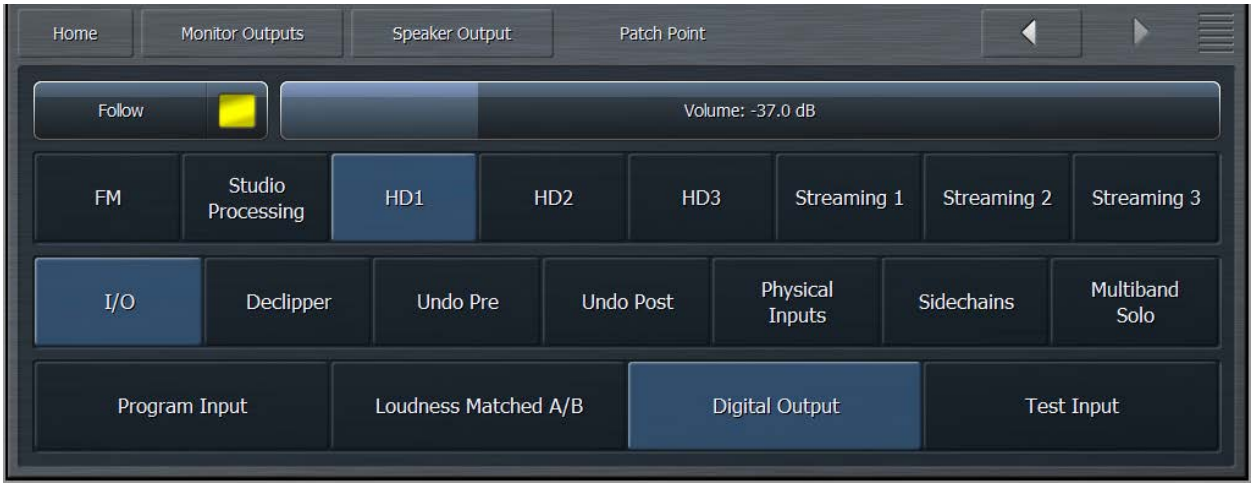
Studio Processing Patch Points

You can feed each of the three Monitor Outputs audio from various points within the Studio Processing core.

- The **I/O** menu allows you to listen to the Program Input or Studio Output.
- The **Physical Inputs** menu allows you to monitor any of the rear panel input points, including Main Digital, AES Reference, Aux Digital, and Analog.

HD-1, HD-2, and HD-3 Patch Points

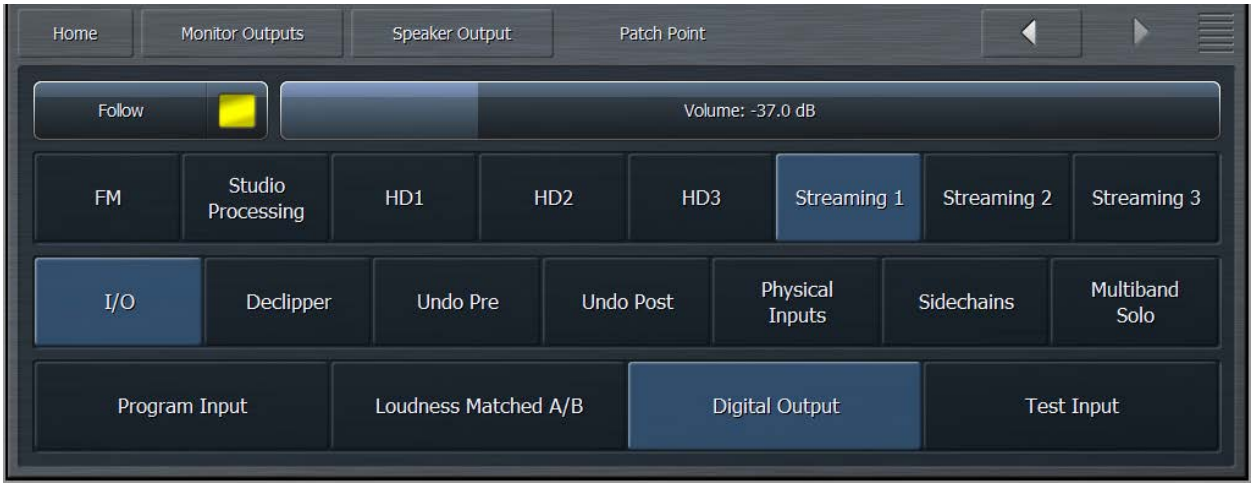
You can feed each of the three Monitor Outputs audio from various points within any of the HD processing cores.



- The **I/O** menu allows you to listen to either the Program Input, the Loudness Matched A/B patch point, the Digital Output, and the Test Input of each HD processing core.
- The **De-clipper** menu lets you monitor the audio either before or after the De-clipper.
- The **Undo Pre** menu lets you listen to the audio of each individual Undo band before it enters the entire Undo chain.
- The **Undo Post** menu lets you listen to the audio of the Undo section, or to each individual Undo band after it has been processed by Undo but before it enters the main audio processing core.
- The **Misc** menu lets you listen to the signal being fed by a test input or after the Loudness Matched Input.
- The **Physical Inputs** menu allows you to monitor any of the rear panel input points, including Main Digital, AES Reference, Aux Digital, and Analog.
- The **Sidechains** menu allows you to monitor the audio passing through the Input AGC, Wideband AGC 1, Wideband AGC 2, and Wideband AGC 3 sidechains, as well as the actual output audio from each of those stages.
- The **Multiband Solo** menu allows you to individually monitor the audio in each band of the multiband AGC.

Streaming 1, Streaming 2, and Streaming 3 Patch Points

You can feed each of the three Monitor Outputs audio from various points within each of the Streaming processing cores.



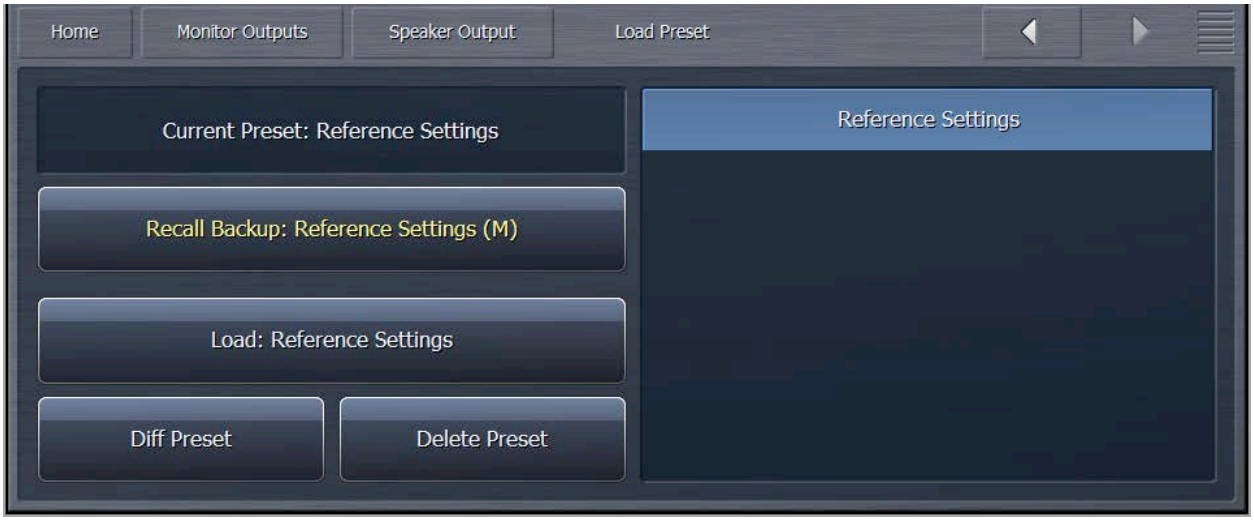
- The **I/O** menu allows you to listen to either the Program Input, the Loudness Matched A/B patch point, the Digital Output, and the Test Input of each Streaming processing core.
- The **De-clipper** menu lets you monitor the audio either before or after the De-clipper.
- The **Undo Pre** menu lets you listen to the audio of each individual Undo band before it enters the entire Undo chain.
- The **Undo Post** menu lets you listen to the audio of the Undo section, or to each individual Undo band after it has been processed by Undo but before it enters the main audio processing core.
- The **Misc** menu lets you listen to the signal being fed by a test input or after the Loudness Matched Input.
- The **Physical Inputs** menu allows you to monitor any of the rear panel input points, including Main Digital, AES Reference, Aux Digital, and Analog.
- The **Sidechains** menu allows you to monitor the audio passing through the Input AGC, Wideband AGC 1, Wideband AGC 2, and Wideband AGC 3 sidechains, as well as the actual output audio from each of those stages.
- The **Multiband Solo** menu allows you to individually monitor the audio in each band of the multiband AGC.

Load Preset Menu

Because Omnia.9 provides all of the tools – minus a calibrated microphone – to perform speaker/room calibrations for each of the Monitor Outputs, it also provides a way for you to store those calibrated settings in the form of presets.

It is important to remember that this menu refers to presets you create and save yourself for speaker calibrations within each of the three Monitor Outputs. *These are not the same as your processing presets!* However, the menus work in the same way.

The Load Preset menu allows you view the preset you are currently feeding to the particular Monitor Output, toggle back and forth between the current and backup presets, load a new preset, compare the settings of two presets, and delete user presets.



- Highlighting a preset from the list places it in the **Load** button. Selecting the **Load** button puts that immediately loads the preset and moves it up to the **Current Preset** position. The preset that was previously audible will become the **Backup Preset**. You may also load a preset directly from the list by double tapping it.

- After changing any parameter of a preset, an **(M)** appears next to the Current Preset name and the text turns yellow to indicate the preset has been modified but not yet saved.

- The Backup Preset also becomes the former (and unmodified) Current Preset. This allows you to toggle back and forth to hear the difference between the original and modified presets.

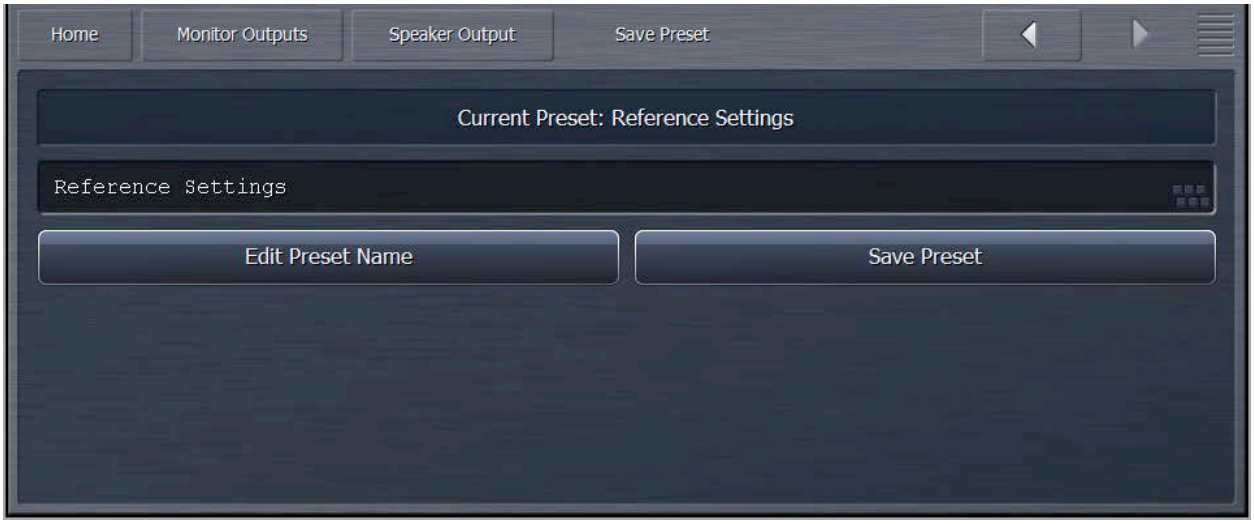
- Changes to each parameter you adjusted to create the modified preset are also displayed in yellow on the specific control button in each section of the processing core, providing an instant visual comparison between the modified preset and the original preset upon which it is based.

- You can also compare the differences between the Current Preset and the Backup Preset, providing neither have been modified, by selecting the **Diff Preset** button. Any control settings in the Current Preset that are different from those in the Backup Preset will be displayed in yellow in their respective sections.

- Selecting the **Delete Preset** button allows you to permanently delete a preset from the list.

Save Preset Menu

The Save Preset menu allows you to edit the name of or save over a preset.

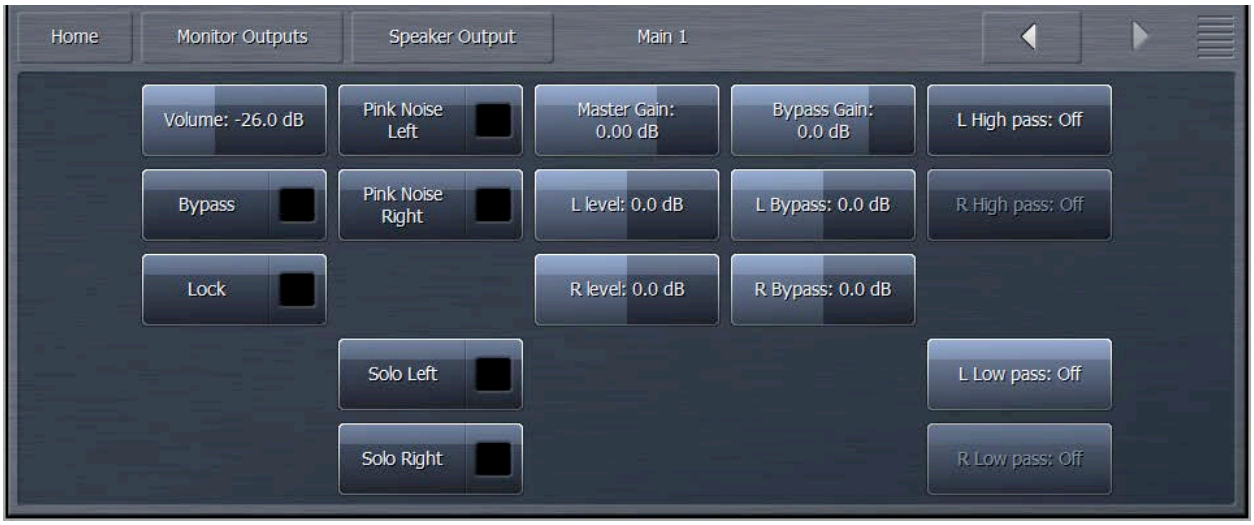


- You can rename your current preset, regardless of whether or not is has been modified, by selecting the **Edit Preset Name** button to bring up the on-screen keyboard. Type in the new name, select “OK”, and select **Save Preset**. The new preset will now appear in the list.

- If your Current Preset has been modified, you also have the option to write over the existing preset without renaming it by selecting **Save Preset**.

Main 1 Menu

The Main 1 menu contains the controls to set the output level of each Monitor Output, enable or disable any adjustable parameters of each output, adjust the master gain level, adjust the left and right levels individually, solo an individual channel, and set a high pass filter frequency for both the left and right channels.



- The **Volume** slider is a duplicate of the control found on the top of the Home screen and controls the output level to the speaker or headphone output.

- The **Bypass** control enables or disables the parametric EQ, loudness contours, and high pass filters.

- The **Lock** control allows you to “lock down” all of the settings, including the patch points and the shortcut settings (such as volume controls) at the top of the user interface. When locked, the controls will appear grayed out. This is especially useful when the “Follow” control is enabled, as it prevents the selected patch point from being accidentally changed by someone connected via a remote client.

    - *Imagine the surprise - not to mention confusion - this would cause the talent if, say, the Speaker Output, which normally feeds the studio monitors with the low latency Studio output, got switched over to the HD-2 signal! And while we’re on the subject, let us go on record as stating we do not endorse the idea of deliberately confusing the talent in this manner. We’re just saying it could accidentally happen… Officially, we strongly recommend locking down any monitor output put in active use.*

- The Monitor Output sections each contain Protection Limiters, a useful feature when performing speaker calibrations, which are often performed at higher than normal volume levels and can involve radical amounts of parametric equalization in the pursuit of a flat frequency response. When the limiters are active, orange bars in the corresponding volume controls will appear indicating that the master gain should be reduced. The **Master Gain** control adjusts the output level of each Monitor Output section relative to the Protection Limiter. You may also find that in the course of calibration you have made significant cuts to achieve a flat output, and need to use this control to raise the output level so that the calibrated and un-calibrated outputs match volume-wise when you compare them by using the Bypass control.

- The **Left Level** and **Right Level** controls allow you to adjust the output gain of each channel individually and act as a sort of “balance” control in situations where the left and right speakers are not equally spaced from the monitor point.

- The **Solo Left** and **Solo Right** controls allow you to monitor only the left or only the right channel.

- The **Left High Pass Filter** and **Right High Pass Filter** controls allow you to set the high pass filter cutoff point to avoid over-driving small speakers. When calibrating smaller bass-shy speakers, there will come a point where you can no longer compensate for such a deficiency by EQ-ing, and it is more practical to simply not try and pass those frequencies at all. That point will be clear on the RTA and is explained in more detail in the Speaker Calibration section.

- The **Pink Noise Left** and **Pink Noise Right** controls turn the pink noise generator in each channel on or off.

Main 2 Menu

The Main 2 Menu contains the controls to set the output level of each Monitor Output, adjust the master gain level, determine whether the left and right channels are adjusted together as a “common” pair for both the parametric EQ and the Delay functions, invert the polarity of each channel, set the overall delay time and individual channel delay, and adjust the Bass Clipper and Limiter Thresholds for each channel.

- The **Volume** and **Master Gain** controls are duplicates of those found in the Main1 menu, but are found here as well for convenience.

- When enabled, the **Common L/R EQ** control “couples” the left and right channels together in the parametric equalizer so that any changes make to the left channel will also be made in the right, eliminating the need to make the same adjustments twice. Disabling this control allows you to EQ the left and right channels differently. This can be useful if, for instance, one speaker is placed in the corner of a room while the other is not, resulting in a different bass response at the monitoring point.

- The **Delay All** control allows you to delay the audio output of the Speaker and Headphone outputs.

- The **Delay Left** and **Delay Right** controls provide a means by which to delay one channel independently of the other.

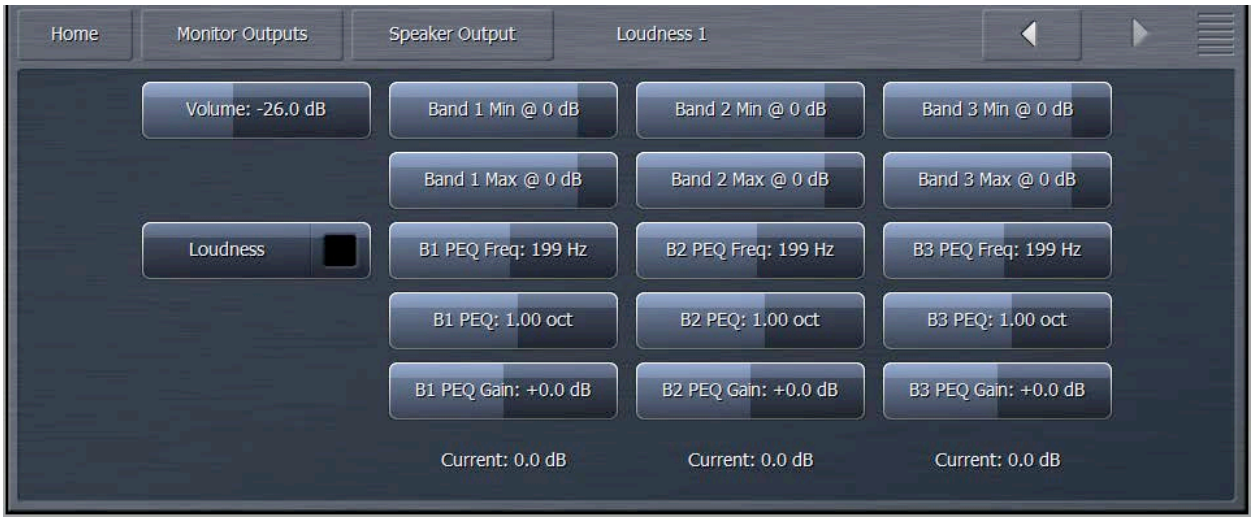
- The **Invert Left** and **Invert Right** controls let you swap the polarity of each channel. The ability to do so in one channel or the other can be useful if you discover that one of the speakers has been wired out of phase and it is not practical or convenient to physically switch the positive and negative wires. Being able to do so to both channels simultaneously can come in handy if you are in a situation where both channels have gotten out of phase at some point in the studio wiring.

- The **Bass Limiter Threshold** controls for the Left and Right channels set the threshold of the bass limiters. *Keep in mind that these controls affect only the monitor output audio and have no effect on any of the on-air processing cores,* but they are very useful when pushing higher volumes and more bass through very small speakers.

- The **Limiter Threshold** controls for the Left and Right channels set the threshold of the Protection Limiters in each Monitor Output section and operate in the same manner as their counterpart in the HD (and other non-FM) Processing cores. As with the Bass Clip Threshold controls, *only the monitor output audio is affected.*

Loudness 1 and Loudness 2 Menus

The Loudness 1 and Loudness 2 menus allow you to automatically change the equalization of each monitor output depending upon the volume level.


Home
Monitor Outputs
Speaker Output
Loudness 1
Volume: -26.0 dB
Band 1 Min @ 0 dB
Band 2 Min @ 0 dB
Band 3 Min @ 0 dB
Band 1 Max @ 0 dB
Band 2 Max @ 0 dB
Band 3 Max @ 0 dB
Loudness
B1 PEQ Freq: 199 Hz
B2 PEQ Freq: 199 Hz
B3 PEQ Freq: 199 Hz
B1 PEQ: 1.00 oct
B2 PEQ: 1.00 oct
B3 PEQ: 1.00 oct
B1 PEQ Gain: +0.0 dB
B2 PEQ Gain: +0.0 dB
B3 PEQ Gain: +0.0 dB
Current: 0.0 dB
Current: 0.0 dB
Current: 0.0 dB

Speaker calibration, which is covered in greater detail later in this manual, is normally done at relatively high volume levels in order to provide adequate gain into the mic to overcome room noise. Normal listening levels may be substantially lower. While the EQ curve of the output of the speakers technically remains the same, the way our ears perceive different frequencies at lower sound levels will cause the audio to sound different. Specifically, lower and higher frequencies will sound softer than mid-range frequencies.

Do not be alarmed if you find you need to add several decibels of low-frequency boost (at a very low frequency and a width of 3.0 octaves or so) in order for the bass to sound balanced at lower volumes. The same is true for higher frequencies, but normally a dB or two is sufficient (perhaps at a very high frequency with a width of 2.0 octaves or so).

- The **Frequency**, **Width**, and **Gain** sliders operate in the same manner as their counterparts in other sections of the Omnia.9 in which a parametric equalizer is offered.
- The **Band Min** slider sets the point at which any equalization established by the Frequency, Width, and Gain sliders are begins to take place.
- The **Band Max** slider sets the point at which the maximum amount of equalization is reached.

If the Gain slider is set to 0dB and the Band Min and Band Max sliders are set to the same value, the equalizers in the Loudness 1 and Loudness 2 menus can be used as additional “static” EQ bands if, for whatever reason, more bands beyond those offered in the Main 1 and Main 2 setting are needed.

Left EQ1, Left EQ2, Right EQ1, and Right EQ2 Menus

The Left EQ1, Left EQ2, Right EQ1, and Right EQ2 menus each provide six bands of fully parametric equalization for each Monitor Output.

Home
Monitor Outputs
Speaker Output
Left EQ 1
Copy
Paste
L Center Freq 1: 199 Hz
L Center Freq 2: 199 Hz
L Center Freq 3: 199 Hz
L Center Freq 4: 199 Hz
L Center Freq 5: 199 Hz
L Center Freq 6: 199 Hz
L Bandwidth 1: 1.00 oct
L Bandwidth 2: 1.00 oct
L Bandwidth 3: 1.00 oct
L Bandwidth 4: 1.00 oct
L Bandwidth 5: 1.00 oct
L Bandwidth 6: 1.00 oct
L PEQ Gain 1: +0.0 dB
L PEQ Gain 2: +0.0 dB
L PEQ Gain 3: +0.0 dB
L PEQ Gain 4: +0.0 dB
L PEQ Gain 5: +0.0 dB
L PEQ Gain 6: +0.0 dB

- The **Frequency**, **Width**, and **Gain** sliders operate in the same manner as their counterparts in other sections of the Omnia.9 in which a parametric equalizer is offered.

- The **Copy** control places the settings from either the Left EQ 1 or Right EQ 1 section onto a “clipboard” so that they can be shared in the opposite channel EQ by using the **Paste** control. This is especially handy if your left and right speakers require nearly - but not quite - identical equalization.

Specific instructions for how to use these controls to calibrate your speakers are offered later in this manual.

Chapter 18
System Menu

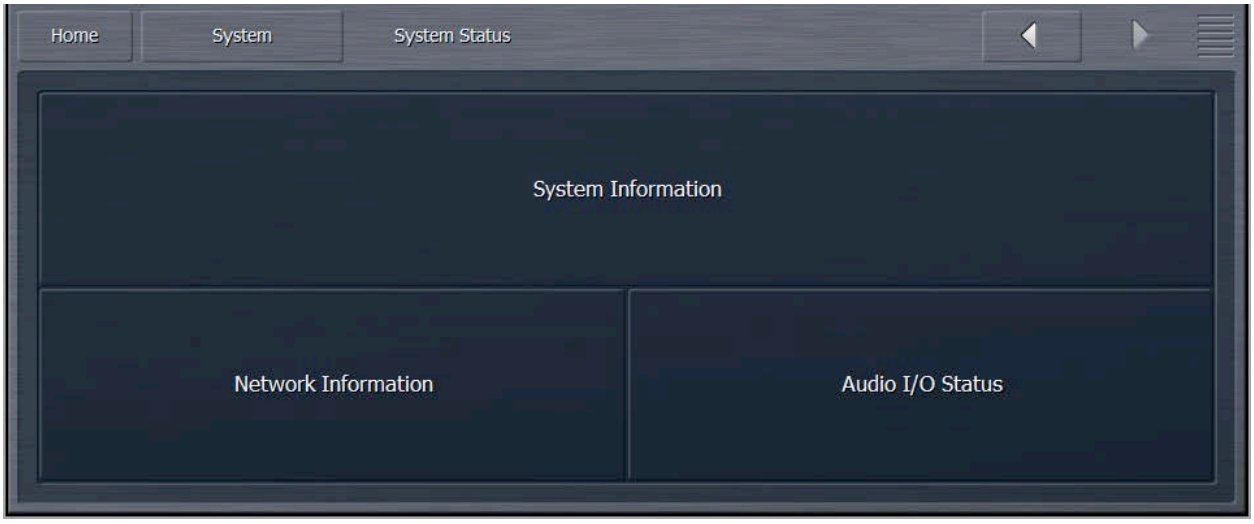
Whatever control you are looking for that is not directly related to processing is probably in here.

The System Menu

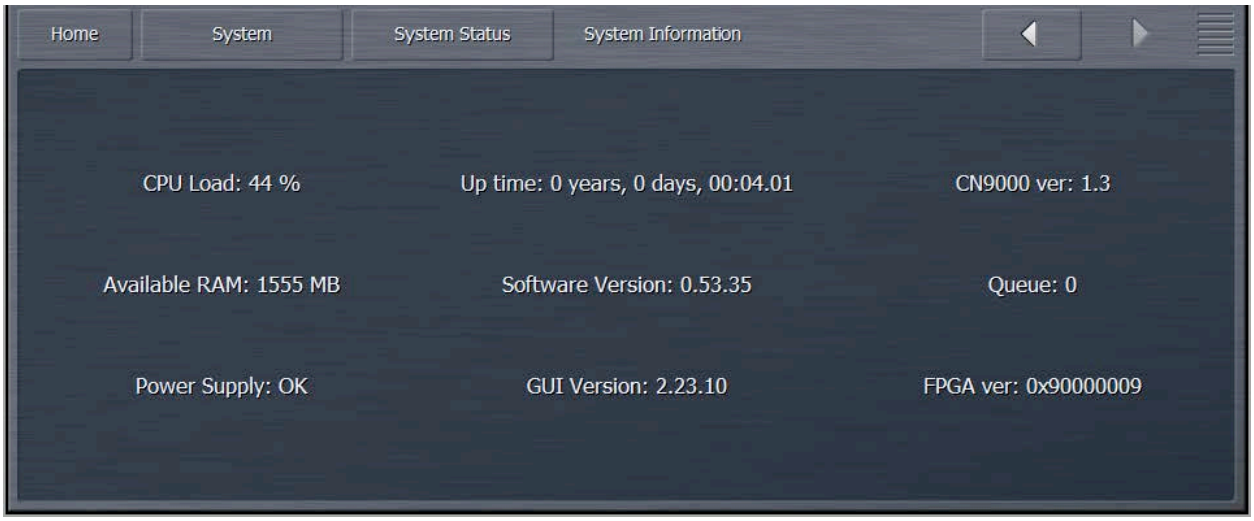
The System Menu contains sub-menus that provide status information about the Omnia.9 itself, audio I/O, and remote connections. It is also where high level “global” settings such as the time and date, input, output, preset scheduling, and GPI configuration are set. It also contains the menus that determine which processing cores and streaming encoders are enabled, where HTTP access and IP information is entered, and where settings for the file recorder are made.

System Status Menu

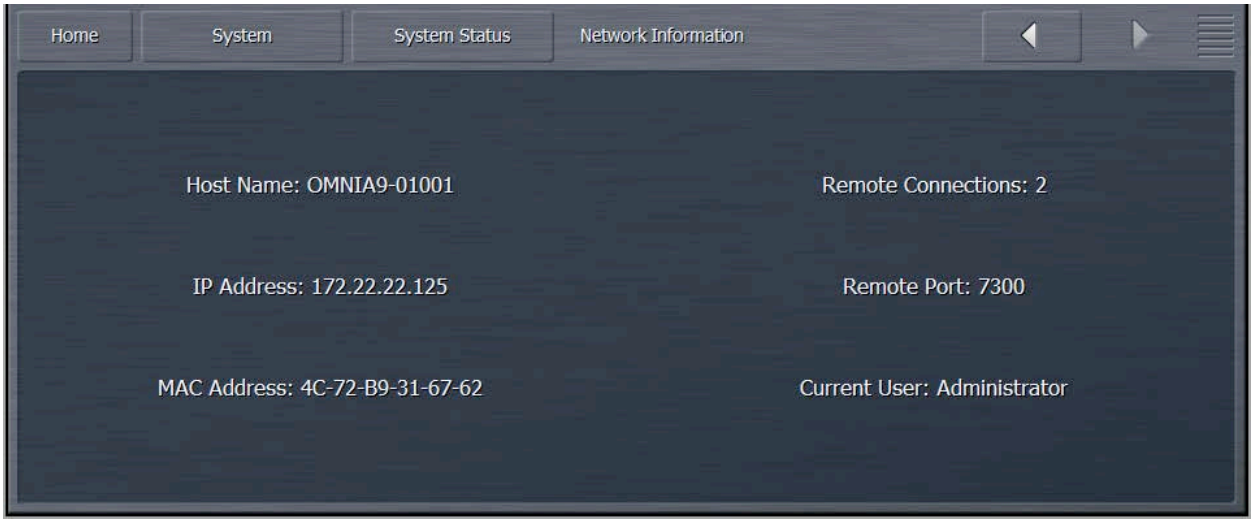
The System Status menu is divided into three sections – System Information, Network Information, and Audio I/O Status.



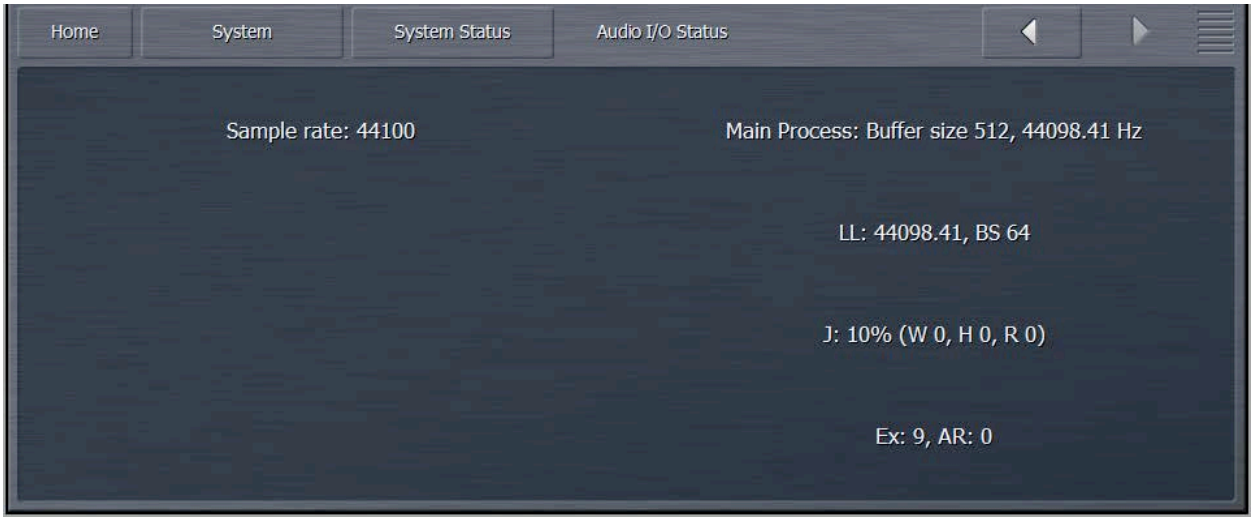
The **System Information** portion shows information about Omnia.9’s operation, including CPU load, available RAM, power supply health, up time, and various software, firmware, and hardware versions.



The **Network Information** section provides information including the host name, IP address, and MAC address of the unit. It also indicates how many users are remotely connected, the remote port number, and the security level of the current user.



The **Audio I/O Status** section shows the current system sample rate as well as detailed information about audio input and output configurations.



I/O Options Menu

The I/O Options menu has various sub-menus, including Load Preset, Save Preset, Input (or multiple inputs depending upon configuration), Source Adjustment, Diversity Delay, Silence Detection, Main Outputs, and FM Options.

Load Preset and Save Preset Menus

All I/O settings in the Input, Source Adjustment, Diversity Delay, Silence Detection, Main Outputs, and FM Options can be saved to an I/O preset file. This makes it very easy to return to a known good configuration if you make a change to one of these settings and need a quick way to “get back home” or if you want to clone settings to transfer to another Omnia.9.

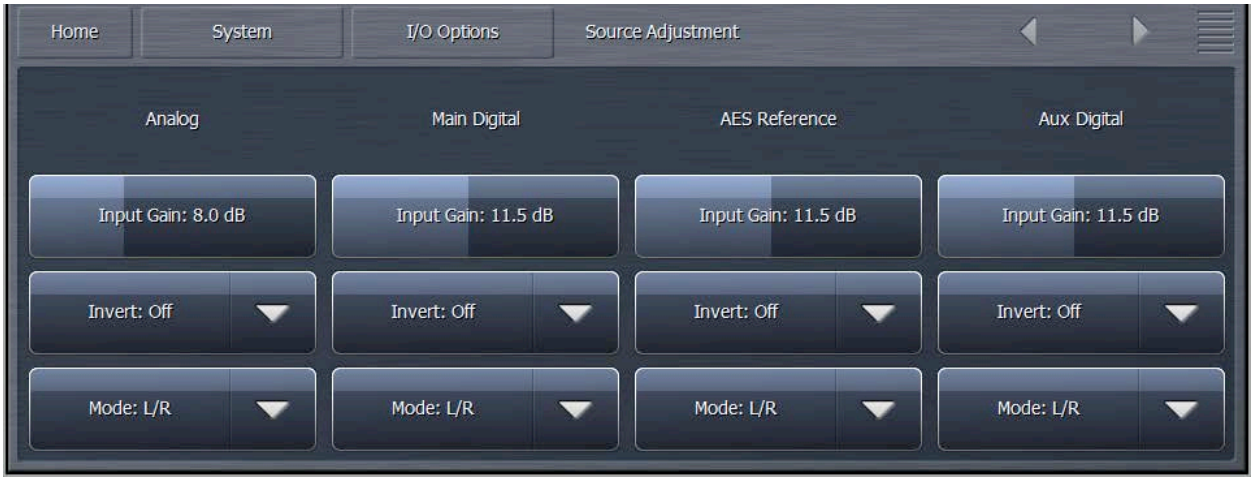
Input 1/2/3 Menus

The Input Options menus are where you choose which physical rear panel input (Analog, Main Digital, AES Reference, Aux Digital) feeds each of Omnia.9’s audio input paths.

- The **Primary Source** drop-down menu determines the audio source of each input.
- In the event you lose audio from the primary source, you may use the **Secondary Input Source** drop-down menu to select audio from an alternate source.
- The **Input Preference** control determines whether or not Omnia.9 keeps the current, secondary audio source on the air after audio returns to the primary input source or switches back to the primary source.
- The **Studio Source** drop-down menu allows the low-latency studio processing core to be fed independently, a useful feature for stations that utilize a profanity delay in their air chain and need a pre-delay feed for talent monitoring.
- When enabled, the **Clip Warning** control will cause the Input meters to flash red when the audio hits full scale. In a normal studio environment, Clip Warning should be turned on to keep the operator from overloading Omnia.9's input. However, if you are in a test environment and feeding a CD player directly into one of the digital inputs, you may wish to turn this control off as clipping present on the CD itself may trigger the Clip Warning.
- The **High Pass Filter** drop-down menu allows you to completely disable the filter or set its frequency to your choice of 15, 30, 45, 60, 70, 80, 90, or 100Hz. The 60, 70, 80, 90, and 100Hz filters are extremely sharp, completely eliminate hum and rumble, and are useful for an all-talk format or a station that still plays live vinyl. The default setting is 30Hz. It is worth noting that the HPF is phase linear.
- The **Low Pass Filter** drop-down menu allows you to completely disable the filter or set its frequency to 17,000, 17,500, 18,000, 18,500, 19,000, 19,500 or 20,000 Hz.

Source Adjustment Menu

The **Source Adjustment** menu contains the controls to set the input gain, invert the polarity of the input audio, and set the input mode independently for the Analog, Main Digital, AES Reference, and Aux Digital physical inputs.



- The **Input Gain** control allows you to adjust a variable gain stage after the clip detector and can be used to boost levels to meet Omnia.9's reference input level as indicated by a green color on the input meters, with an adjustment range of 18dB.

- The **Invert** control allows you to swap the polarity of only the left channel input, only the right channel input, or both the left and right channels simultaneously.

- The **Mode** control offers five combinations to determine how the input audio is fed into Omnia.9 in terms of left and right channels.

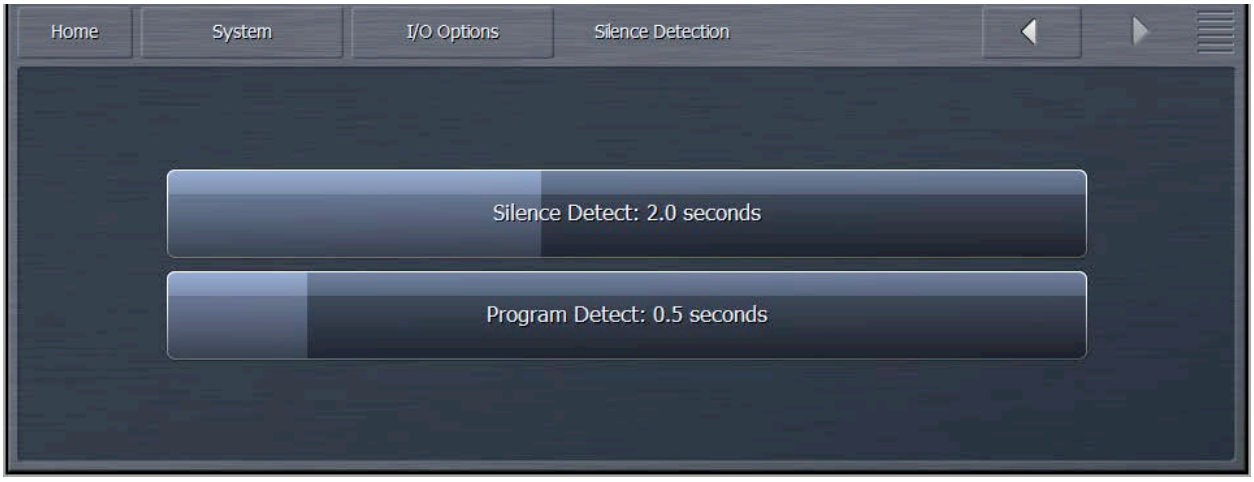
    - **L/R** sends left channel input audio to the left channel and right channel input audio to the right channel (default setting).
    - **R/L** sends left channel input audio to the right channel and right channel input audio to the left channel.
    - **L+R** sends both right- and left-channel input audio to both the left and right channels.
    - **L** sends only left-channel input audio to both the left and right channels.
    - **R** sends only right-channel input audio to both the left and right channels.

Diversity Delay Menu

The amount of delay introduced to the FM analog signal in order to match the corresponding HD-1 audio is set with in this menu with the FM Diversity Delay slider, ranging between 0 and 20,000 ms. Setting this control properly (and monitoring your FM and HD-1 signals regularly) will ensure as smooth a transition as possible between the analog and digital signals for listeners with HD receivers.

Silence Detection Menu

As previously indicated, Omnia.9 can switch over to a user-determined secondary input source when audio from the primary source is interrupted.



- The **Silence Detect** control determines how long Omnia.9 will wait before switching over to the secondary input source. It also determines how long the unit will wait before switching back to the Primary source if the Input Preference control in the Input > I/O Options menu is set to Current.

- If the Input Preference control in the Input > I/O Options menu is set to Primary, the **Program Detect** control adjusts how long the unit will wait once it has determined that audio has been restored to the primary input. If the Input Preference control is set to Current, this control will determine how long it waits to return to the primary input if audio is lost on the secondary input.

Main Outputs Menu

The **Main Outputs Menu** determines which audio source is present on each of the rear-panel connections including Main FM Out 1, Main FM Out 2, Aux Out, and Analog Out and provides output level adjustments for each.

It also controls the source audio for the AES Main FM Out 1 and Out 2 outputs and enables the use of the AES Main FM Out 1 and Out 2 as Omnia Direct sources, the system jointly created by Nautel and Omnia which digitally transfers the composite signal from the processor directly to the exciter.

Home
System
I/O Options
Main Outputs
Main FM Out 1: HD1
Main FM Out 1 Level: 0.0 dB
AES Main FM Out 1: L/R Audio
Main FM Out 2: HD2
Main FM Out 2 Level: 0.0 dB
AES Main FM Out 2: L/R Audio
Aux Out: HD3
Aux Out Level: 0.0 dB
Analog Out: FM Pre-emph L/R
Analog Out Level: -6.8 dB

- The **Main FM Out 1, Main FM Out 2, Aux Out, and Analog Out** drop-down controls offer a choice of FM pre-emphasized or FM de-emphasized audio, audio from the HD-1, HD-2, and HD-3

processing cores (depending upon configuration) and audio from the Headphone, Speaker, and Aux monitor outputs.

- ***Note:*** *FM De-emphasized L/R is can feed a stereo generator which provides pre-emphasis, but this scenario does have the potential to cause overshoots which could result in a slight loss of loudness. The Omnia.9 should be the ONLY device providing the FM Pre-Emphasis. Any pre-emphasis in the FM Exciter/Transmitter should be defeated.*

- The corresponding **Level** sliders adjust the output levels.

- The **AES FM Out 1** and **Out 2** drop-down controls set the source audio for the Omnia Direct outputs and include L/R audio, MPX 1, MPX 2, or both MPX 1 and 2.

FM Options Menu

The **FM Options** Menu contains controls related to the composite and L/R output sections. Included here are adjustments and settings for the MPX Power Limit, Pilot Level, Auto Pilot, MPX and L/R Output Bandwidth, MPX and L/R Output Levels, Stereo Mode, RF Bandwidth Controller, L/R Codec Safety settings, and the built-in MPX Test Generator.

- The **MPX Power Limit** slider is used to set the MPX power as appropriate for particular countries when MPX Power is enabled.

- The **Pilot Level** control allows you to set the level of pilot injection over a range of 0 to 20% in one-tenth dB increments.

- **Auto Pilot** is a feature that automatically turns off the pilot when mono audio is detected which can help reduce multipath distortion and eliminate stereo noise when it is most noticeable, such as on dry voice.

- The **MPX Output Bandwidth** control gives you the choice of setting the bandwidth of the composite outputs to either 16.5kHz or 16kHz. 16.5kHz is fully compatible with all receivers, and is the recommended setting. The **L/R Output Bandwidth** slider performs the same function for the Left/Right outputs but with a choice of 15, 15.5, 16, or 16.5kHz.

  - ***Note:*** *If you are using a 32kHz STL, you will need to set the L/R Output Bandwidth to 15 or 15.5 to prevent over-modulation.*

- The **Stereo Mode** control allows you to choose between single-sideband (SSB) or dual-sideband (DSB) operation.

- Enabling the **RF Bandwidth** Control can tightly control the RF bandwidth to reduce multipath problems. The **Strength** slider determines the amount of control applied.

  Because multipath issues are so specific to particular locations, the only practical way to determine the best setting for your station is by trial-and-error while driving to locations that are known to be problematic. With a Wi-Fi hotspot and a laptop or tablet running Omnia 9's remote software, it is entirely possible to make these adjustments on the fly and in real time.

  - ***Note:*** *The significance of this feature warrants a detailed explanation. Because certain sounds such as stereo-mic'ed piano (the first few notes of "My Immortal" by Evanescence serves as a good example) can cause excessive stereo reception problems.*

    Looking at the MPX spectrum of this song in particular, you will notice two very tall high frequency peaks: One at 37890 Hz and another at 38110 Hz. The original audio had a piano note at 110 Hz, recorded with stereo microphones, and has very little phase correlation between the left and right channels. Thus, due to the FM stereo system, which amplitude modulates the Left-Right difference signal by 38000 Hz, these two high frequency peaks result.

    You may also notice that they are several dB's stronger than the pilot tone, but at twice the frequency. When this signal gets frequency modulated (as your exciter will do), these very tall high frequency peaks will cause very wide sidebands in your RF carrier, potentially causing multipath reception problems, which would be especially audible here due to the sparse audio content.

    The careful observer may recognize that although SSB (Single Sideband) normally reduces RF bandwidth, it will not help in this case. In SSB we lose the 38110 Hz peak, but we still have the 37890 Hz peak, and with SSB it's 6dB stronger than before.

    One solution would be to statically reduce the L-R signal as some processors do. However, this narrows the entire stereo image no matter what the audio content and is the equivalent of shooting a fly with a cannon.

    Instead, Omnia.9's RF Bandwidth Controller (which is actually a limiter with thousands of bands) allows it to attenuate only the frequencies that cause problems without affecting the rest of the stereo image. This means tight control over your RF bandwidth without audible loss of stereo separation!

- The **MPX1 Output** and **MPX2 Output** Level sliders provide very precise control of the composite output levels of each MPX output section with a range of -30 to 0db in one-hundredth dB increments.

- The **MPX1 Mode** and **MPX2 Mode** controls determine which signals are fed to the composite outputs. Choices include MPX Output, L/R Output, Pre-emphasized Input, MPX Input 1, and MPX Input 2. These last options allow you to pass Omnia.9's external MPX inputs directly through to the Omnia.9 on the air. You can compare off-air audio using calibrated speakers and the speaker output (or client audio output) without affecting on-air audio.

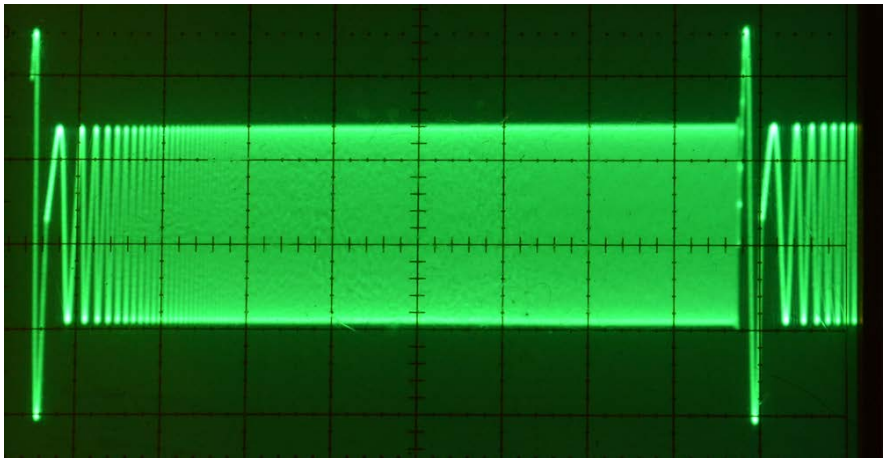
- The **L/R Codec Safety** drop-down control can be used to limit high-frequency headroom of the L/R output, a benefit when using a compressed digital STL and lower bit rates as it may help prevent bit rate reduction-induced peak overshoots. Settings are Off, Light, Medium and Heavy. You can see the exact effect it has by looking at the oscilloscope set to L/R Output with oversampling enabled.

- The **MPX Test Generator** and **L/R Test Generator** are described in detail below.

MPX Test Tone Generator: Control Details and Suggested Applications

The MPX and L/R Test Tone Generator controls allows you choose from several key test tones which can be very useful for testing and proofing transmission path components.

- **Square** is a 60Hz square wave useful for visualizing tilt.
- **Quick Sweep** is a very fast 1,000 – 60,000Hz sweep with a click before each sweep, designed to offer a visual reference as to the high frequency performance of your STL or exciter. If you were to connect an oscilloscope to a calibrated tuner with MPX output (such as the Belar Wizard, for example) this is the shape you would see if your STL or exciter had a flat high frequency response:



  Any deviation from a flat high frequency response means a loss of loudness and/or stereo separation.

- **Sweep (MPX)** is a slow linear frequency sweep between 30 and 60,000 Hz.
- **Log Sweep (MPX)** is a logarithmic equivalent.
- **400Hz** is a full amplitude sine wave to allow you to set an exact 75kHz deviation with a mod monitor.
- **0.5 – 5.0** and **0.5 – 30.0** are subsonic sweeps that allow you to see the extreme low frequency response of your air chain.
- **30Hz** is a 30Hz sine wave. *Certain exciters will go into protection mode if fed a full modulation sine wave this low in frequency, so please be careful!*
- **30 Hz Phase Invert** produces a 30 Hz sine wave which abruptly changes phase twice per second. This test tone allows you to verify DC coupling of Omnia.9's composite output (with an external oscilloscope), as well as your exciter and your modulation monitor. Many exciters and even more modulation monitors have inaccurate low frequency response, which will cause severe over-modulation (or erroneously display severe over-modulation) if the low frequencies abruptly change, such as is customary in music that contains kick drums (which most songs do!).

- **Bessel Null 31,187.6Hz** allows you to set exact +/- 75kHz modulation with a direct off-air spectrum analyzer.

Omnia.9 provides extremely tight modulation control. Your modulation monitor's meter should essentially stand still at 75kHz. (The composite meter in Omnia.9 will stand still at 75kHz no matter what any external equipment is doing). If it does not, **lack of DC coupling** is a likely culprit. To test for this, follow these steps:

- Connect an Oscilloscope (making sure it is DC coupled, not AC coupled) to Omnia.9's composite output.
- Select 400 Hz. Adjust the oscilloscope input level to accurately reach a particular set of lines.
- Select 30 Hz. Verify that the peaks reach the same lines at the exact same spot.
- Select 30 Hz Phase Invert. Verify that the peaks reach the same lines and never overshoot. For a "control sample", set your oscilloscope to AC coupling, and watch the waveform bounce.

We have now verified that Omnia.9's composite output is exactly accurate. You may also try the other test tones as well as program audio.

Here is another test, this time checking for overshoots:

- Connect Omnia.9's composite output to your exciter and look at your modulation monitor.
- Select 400 Hz and adjust for exactly 100% modulation.
- Then select 30 Hz and verify that you are reaching the same modulation level.
- Finally, select 30 Hz Phase Invert.

You will likely see some overshoot, but if you see more than a percent or two, then either your exciter (or STL) is causing the overshoots OR your modulation monitor is displaying overshoots that are not there. In extensive field testing, this problem has proven to be much more common than we ever thought! Please note that this problem affects every processor, but it has just never been as easy to pinpoint as it is now due to the presence of Omnia.9's built in signal generator.

The **L/R Test Generator** menu section has the same options (minus Bessel Null) but there are a couple of differences to keep in mind. Specifically, **Sweep L/R** is a slow linear frequency sweep between 30 and 16.000Hz and **Quick Sweep** is a quick sweep between 1000 - 18.000Hz, with a click before each sweep.

The click allows you to adjust the trig level of your oscilloscope to stabilize the display. Quick Sweep goes all the way up to 18,000Hz to allow you to visualize the low pass filter of your stereo generator.

Additionally, all L/R test tones are generated *before* any de-emphasis inside the Omnia.9, allowing you to verify performance of your stereo generator by connecting its output to one of Omnia.9's composite inputs, and compare theory and practice on two internal oscilloscopes side by side by using the L/R Pre-emph Output patch point (Left Pre-emphasized) with the MPX Input patch point (Left De-mod).

Having a perfectly accurate result (visibly looking the same) is absolutely achievable, so please do not accept anything less, as any inaccuracies will cost you both loudness and audio quality!

File Recorder Menu

Omnia.9 features three built-in file recorders that allow you to capture audio from various points within the processing chain onto a USB flash drive or hard drive.

Before you begin, select the “Name” input field and assign a name to your new file. Then choose which processing core (FM, HD-1, HD-2, HD-3, Stream 1, Stream 2, or Stream 3) you would like to record. Next, pick a patch point from within the processing chain. Finally, enable “Rec” to start recording.

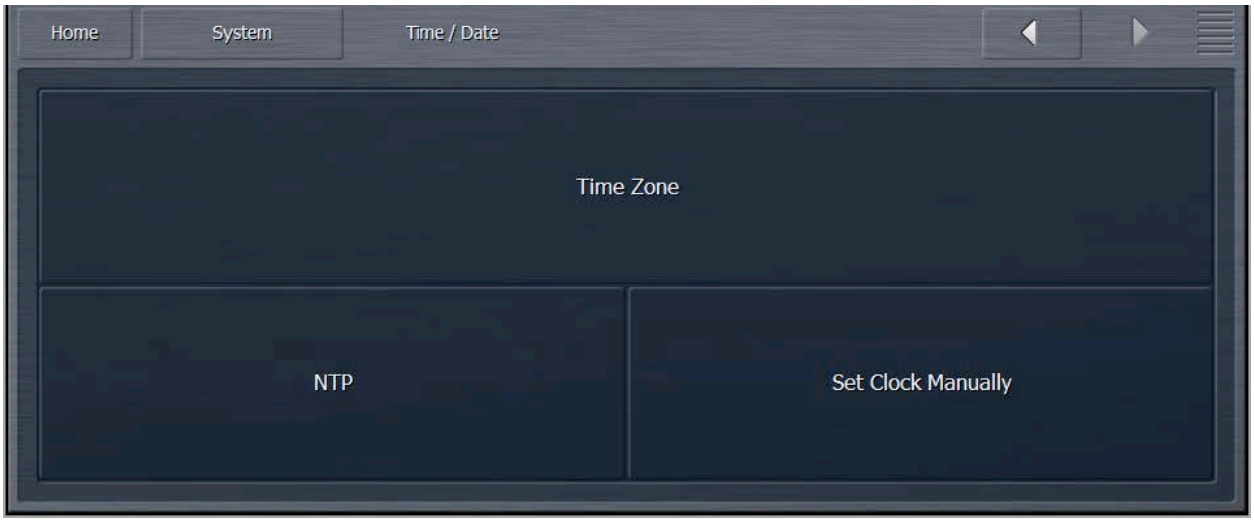
- The **Vox** control, when enabled, pauses recording when no audio is present and has a selectable timeout setting.
- The **Gain** slider controls the input level into the recorder. If, for example, you are recording from the MPX patch point with this control set at -3dB, you will get a -3dB peak MPX file, suitable for use in a modulation monitoring software program such as MpxTool.
- The **Minimize File Size** control automatically adjusts the recording resolution to match the actual noise floor of the audio, allowing you to record a full hour of off-air MPX audio in a file size of only 500mb. The resulting FLAC file can still be read by any program that supports FLAC.

If you are recording directly from the Omnia.9 unit or on a remote computer with a high speed connection to Omnia.9, the Source window will show “PCM,” indicating the recording will be uncompressed PCM source data. If you have a slower remote connection, the window will show “Vorbis” indicating that you will be recording the decoded output of a lossy codec. In either case, the recorder always produces a FLAC (Free Lossless Audio Codec) file.

You also have the option to use Omnia.9’s Time-Based File Splitting feature, which allows you to record files of a specified length (15 minutes, 30 minutes, 1 hour, 2 hours, 3 hours, or 4 hours). As it is sample-accurate, you can splice the files together after recording if you like. There is no file limit size (other than the amount of space on your external drive) so file splitting is not required, only an option.

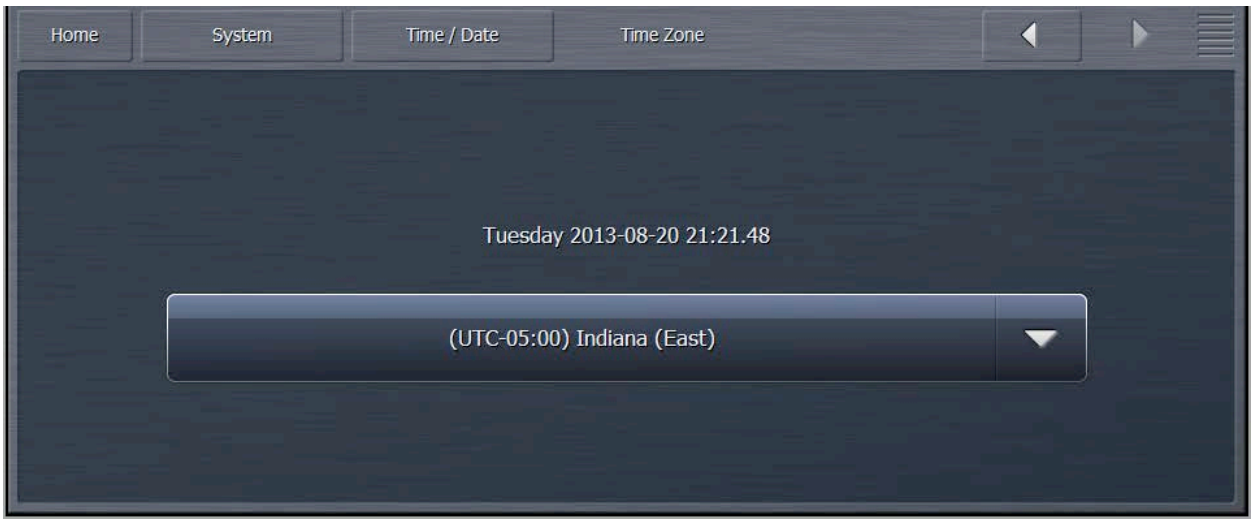
Time/Date Menu

The **Time/Date** menu has three sub-menus for setting Omnia.9’s internal clock: Time Zone, NTP, and Set Clock Manually.



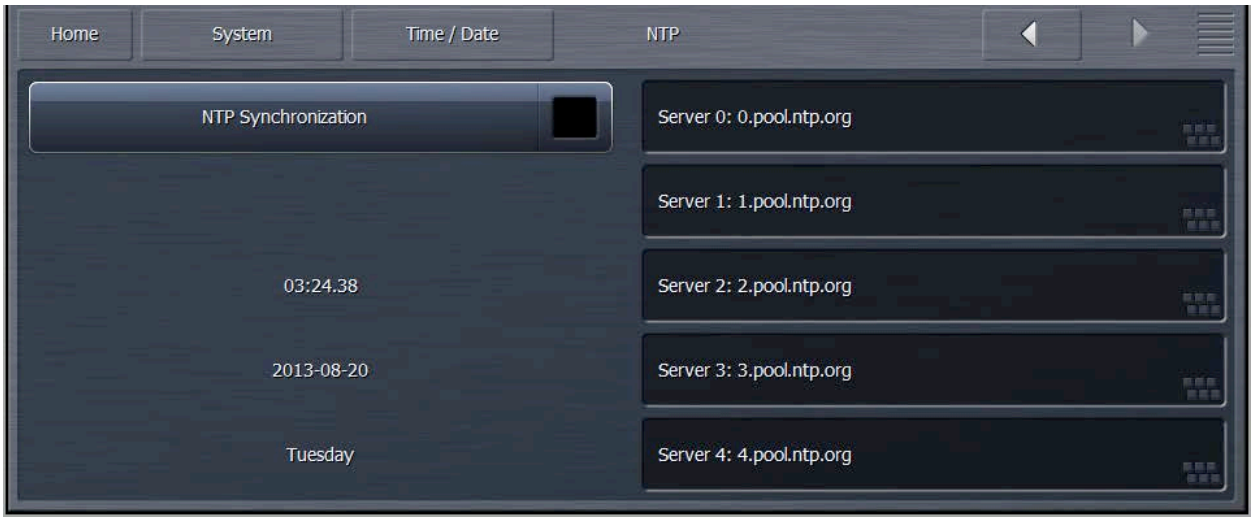
Time Zone Menu

The **Time Zone** menu allows you to choose the proper time zone for your particular geographical area. Daylight Savings Time is automatically applied in applicable time zones.



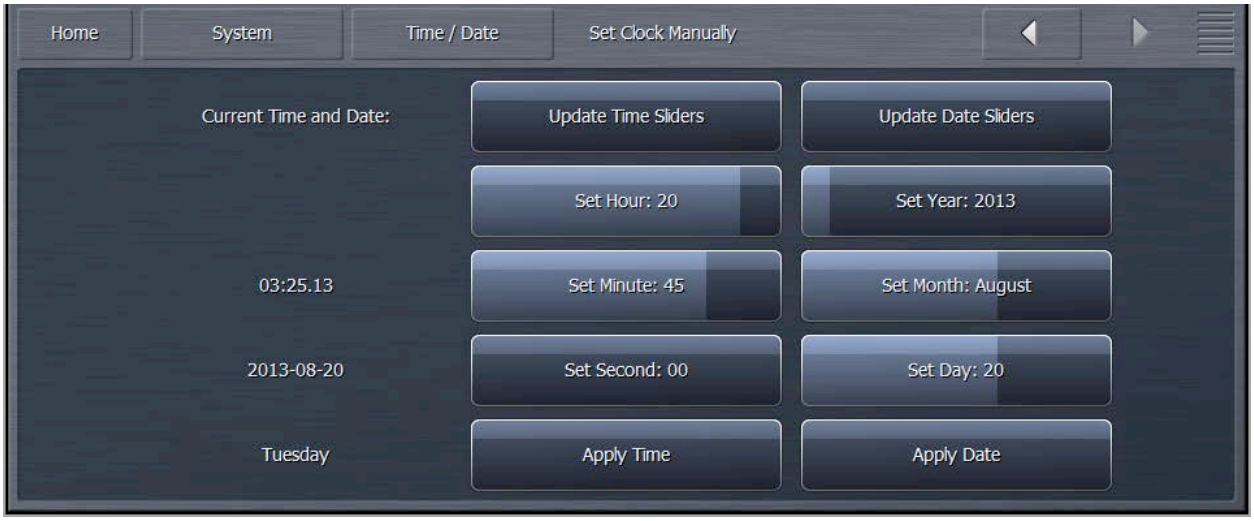
NTP Menu

The **NTP** menu contains the addresses for five Network Time Protocol servers. When enabled, **NTP Synchronization** will use one of these servers to keep the Omnia.9's clock synchronized.



Set Clock Manually Menu

The **Set Clock Manually** menu contains the controls for manually setting the time and date.



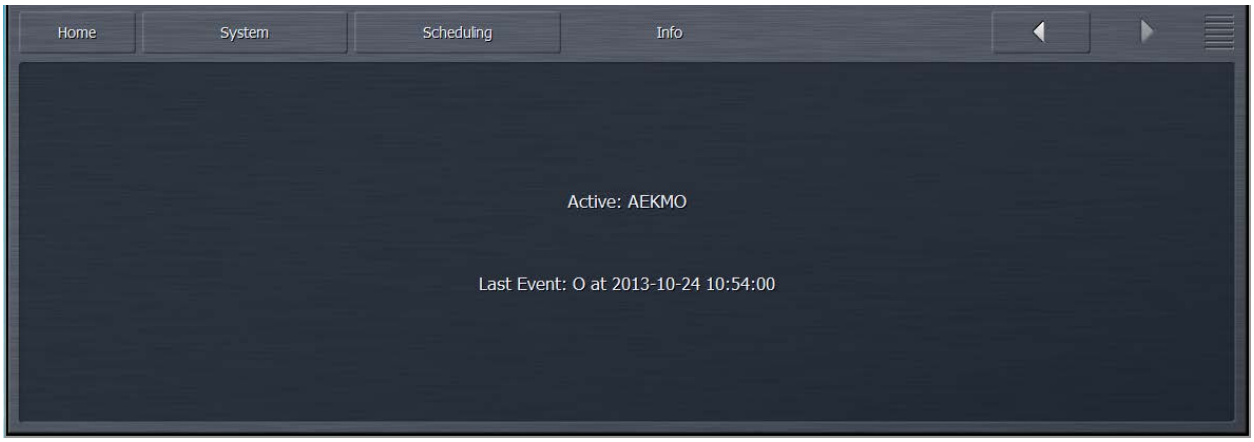
- Selecting the **Update Time** or **Update Date** sliders will refresh the time displayed on the sliders. Use the Set Hour, Set Minute, Set Second, Set Year, Set Month, and Set Day sliders to reflect the current time and date, then select Apply Time or Apply Date to put the new values you've set into effect.

Scheduling Menu

The **Scheduling** menu allows you to program up to twenty-six (26) day- and time-driven events, including switching Undo Presets for each input, changing processing presets for the FM, Studio, and each HD and Streaming processing cores, and controlling the dry voice detector for each core.

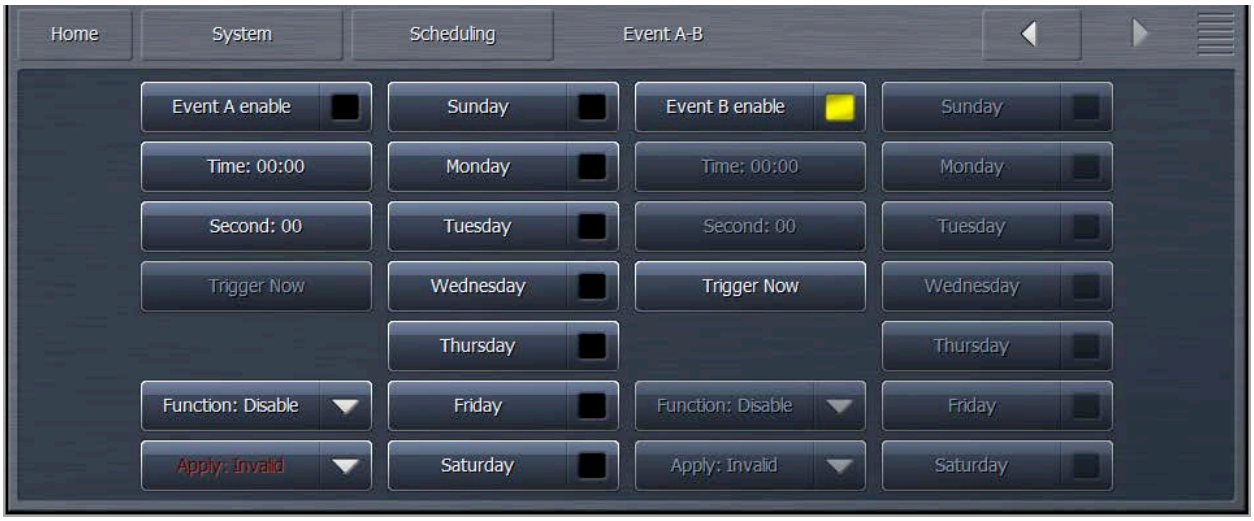
Info Menu

The **Info** Menu displays events that are currently active (such as A, E, K, M, O) and the most recent past event.



Event Menus (A-B, C-D, E-F, etc.)

Each **Event Menu** window simultaneously displays controls for two separate events. An event may be scheduled on one, several, or all days of the week by enabling the Day of Week control for a particular day(s).

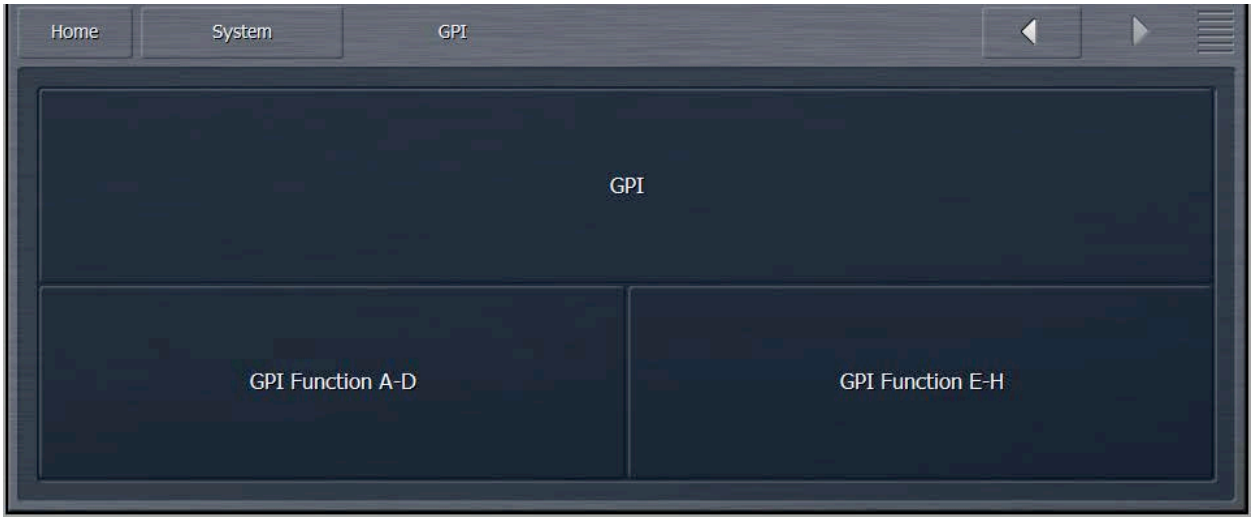


- The time at which the event occurs is determined by the **Time** (hours and minutes) and **Second** (seconds) sliders.
- The **Function** control selects the general event category, while the pull-down menu beneath the Function control is context-sensitive and provides a list of choices appropriate for the general event category. For instance, if the Function control is set to “FM Processing Preset,” a list of processing presets will be displayed.
- Once these parameters are set, the **Event Enable** control – not surprisingly – enables that event to occur at the specified date and time.
- ***Note:*** *Be sure to set the day, time, and function parameters prior to enabling an event.*
- Clicking or tapping the **Trigger Now** button executes the event immediately.

The current event remains active and on the air until the next scheduled event occurs. If only one event is scheduled, those parameters will remain active indefinitely or until another event is added to the schedule.

GPI Menu

The **GPI** menu contains only one control to enable or disable GPI functionality. When enabled, the following functions can be controlled: Undo Preset (per processing core), Processing Preset (per processing core), and Dry Voice Detection (per processing core). Input Source selection is not yet available, but may be added in a future software update.



GPI Enable

The **GPI Enable** control is used to turn GPI on or off. Please note that GPI must be disabled in order to edit and configure the individual GPI functions.

GPI Function A-D / E-H

- The **Function** control in each GPI channel - A through H - determines which available parameter is affected when the input signal is received.
- The **Lo** and **Hi** controls work together to determine the specific action that occurs to the parameter selected by the Function control.

Pins 2 through 9 are GPI inputs 1 through 8. Pins 18 through 25 are ground.

If a system is using relay logic, a contact closure from GPI to ground is “engaged” and an open contact is “”not engaged”.

If supplied by a 5V GPO, 0V is GPI “engaged” and 5V is GPI “not engaged”. A 3.3V signal will also work.

For continuous behavior, use one GPI for the action as follows:

- LO - Setting 1
- HI - Setting 2

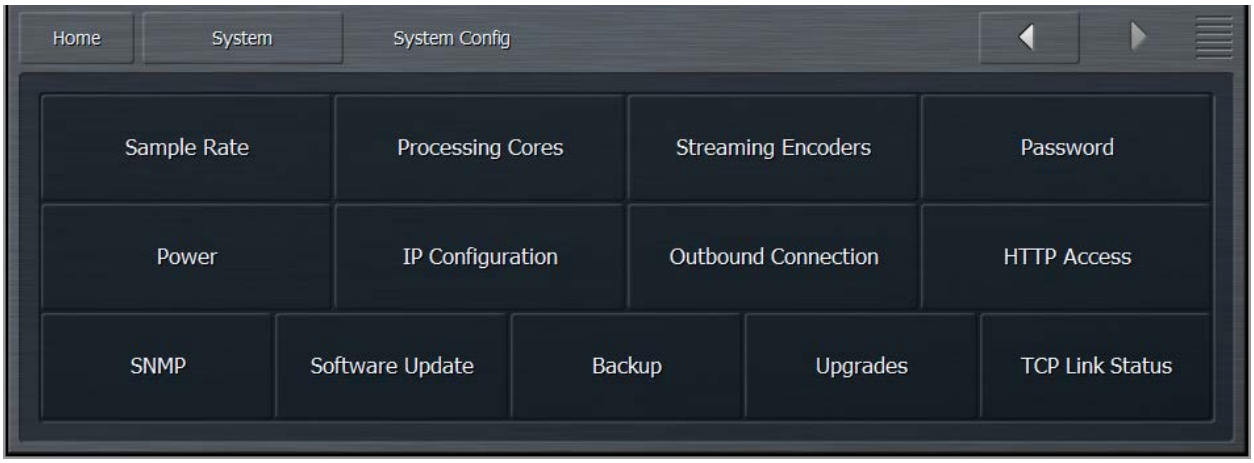
For momentary behavior, use two GPI's for the action as follows:

- GPI 1 LO - Setting 1
- GPI 1 HI - No change
- GPI 2 LO - Setting 2
- GPI 2 HI - No change

Always remember to re-enable GPI after making any changes!

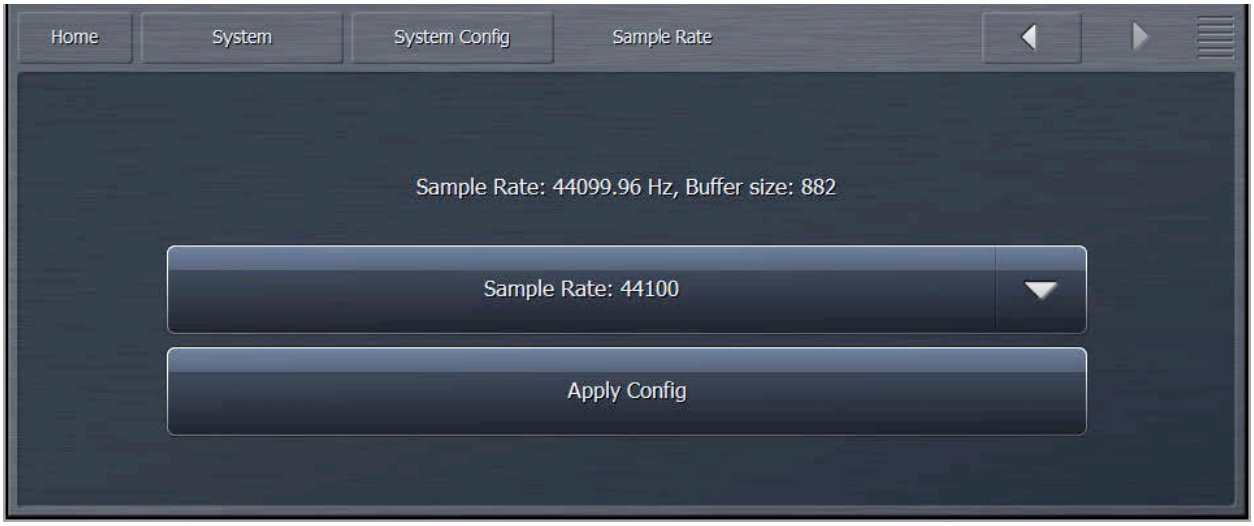
System Configuration Menu

The **System Config** menu contains the controls to select an internal sample rate, determine how many processing cores are available, how many streaming encoders of each variety are available, set a system password, power cycle or shut down the unit, set a display timeout, establish an IP "white list" for remote HTTP access, assign an IP address to the unit, and set up SNMP. You can also check the software and GUI versions, save your custom configurations to a USB drive, update to the latest software versions, and, if you purchased an Omnia.9 without the additional HD and streaming capabilities, unlock additional HD and streaming cores via software key.



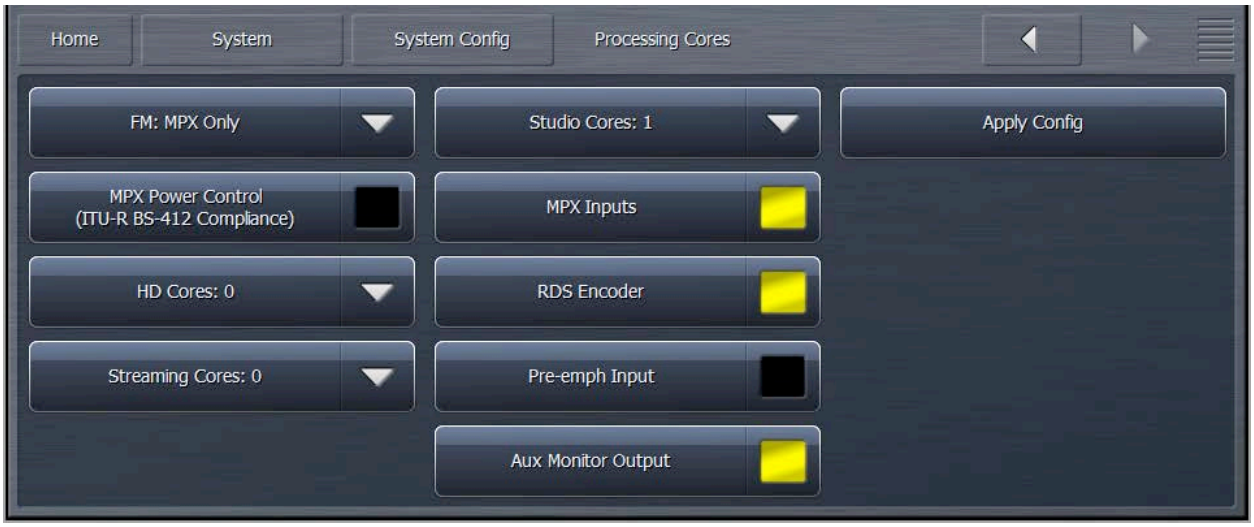
Sample Rate Menu

The **Sample Rate** menu lets you choose the internal sample rate at which Omnia.9 will run, either 44.1kHz or 48kHz. The default rate is 44.1kHz. Be sure to select **Apply Config** to put the changes into effect, keeping in mind that doing so will cause an interruption to program audio as Omnia.9 re-starts.



Processing Cores Menu

The **Processing Cores** menu allows you to choose the type and number of FM, HD, and streaming processing cores available, enable MPX Power Control for ITU-R BS-412 Compliance, and enable the studio processing core, the composite inputs, an additional auxiliary monitor output.



- The **FM** pull-down menu allows you to enable a processing core for the FM MPX (composite) output, L/R output, or both.
- The **MPX Power Control** control allows Omnia.9 to operate in compliance with ITU-R BS-412 regulations.
- The **HD Cores** menu lets you choose how many HD processing cores are available.
- The **Streaming Cores** menu allows you to choose how many streaming processing cores are available.
- The **Studio Core** menu enables or disables the dedicated studio core, an independent low-latency path especially suited for talent monitoring.

- The **Aux Monitor Output** is a third speaker controller, similar to the Speaker and Headphone Outputs, which can be used to route audio to another studio or area of the station. Because it is fully routable and can provide audio from many different patch points within Omnia.9, you can also use it to feed audio to another processor.

- The **Pre-emph Input** control is similar to the MPX inputs, but is provided when the L/R output (either flat or pre-emphasized) of another audio processor is fed into Omnia.9.

    - ***Note:*** *This input can receive audio from any of Omnia.9's three digital inputs only, not the analog input, as the analog input is not DC coupled.*

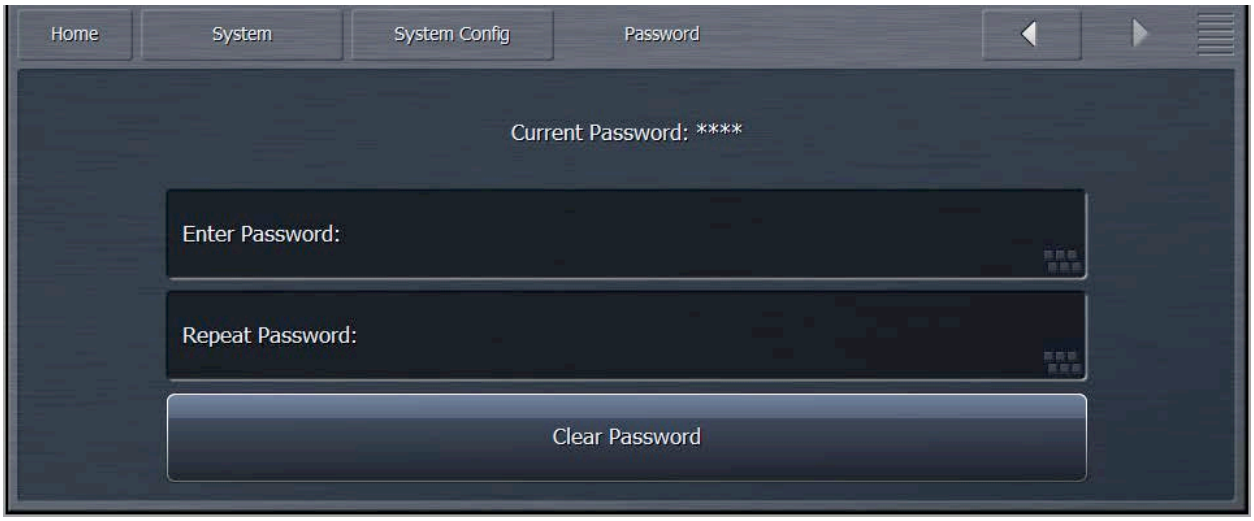
Streaming Encoders Menu

The **Streaming Encoders** menu allows you to select the maximum number of each type of encoder available (AAC, MP3, WMA, MP2, and Vorbis).

- Selecting the **Apply Config** button will places any changes you have made into effect. This will take your station off the air and disconnect all streams for a few seconds.

Password Menu

The **Password** menu allows you to password protect your Omnia.9.



- Selecting the **Enter Password** field brings up the on-screen keyboard for entering a system password, which must be entered again in the Repeat Password field for verification.
- To lock the front panel touchscreen, select the **Menu** button on the Home Screen and choose **Lock Front Panel**. To clear the passwords, leave both the **Enter Password** and **Repeat Password** fields empty and select **Clear Password**.
- To unlock the unit, enter your password and select **Unlock**. If you forget your password, Omnia support can help you unlock your unit.

Power Menu

The **Power** menu provides a means by which to restart or shut down your Omnia.9 and adjust the front panel display timeout.

- The **Power Cycle** option safely shuts down the unit and restarts it – akin to a computer “reboot.”

- The **Safe Shutdown** option properly and completely shuts down the unit. This function is available only on the front panel, not through the remote software, as accidentally pressing it could result in an unplanned visit to the transmitter site!

- The **Display Timeout** menu determines how long the front panel display remains on after it was last used. It can be set to stay on for 10 minutes, 1 hour, 10 hours, or 24 hours. The default setting is 24 hours.

    - ***Note:*** *This applies only to units with serial number 0026 and later and is not shown as an option on the earliest units regardless of software version.*

IP Configuration Menu

The **IP Configuration** menu allows you to assign an IP address to the Omnia.9 and enter subnet mask and gateway information for your network.

- The **Use DHCP** button allows your local router to assign an IP address to the unit.

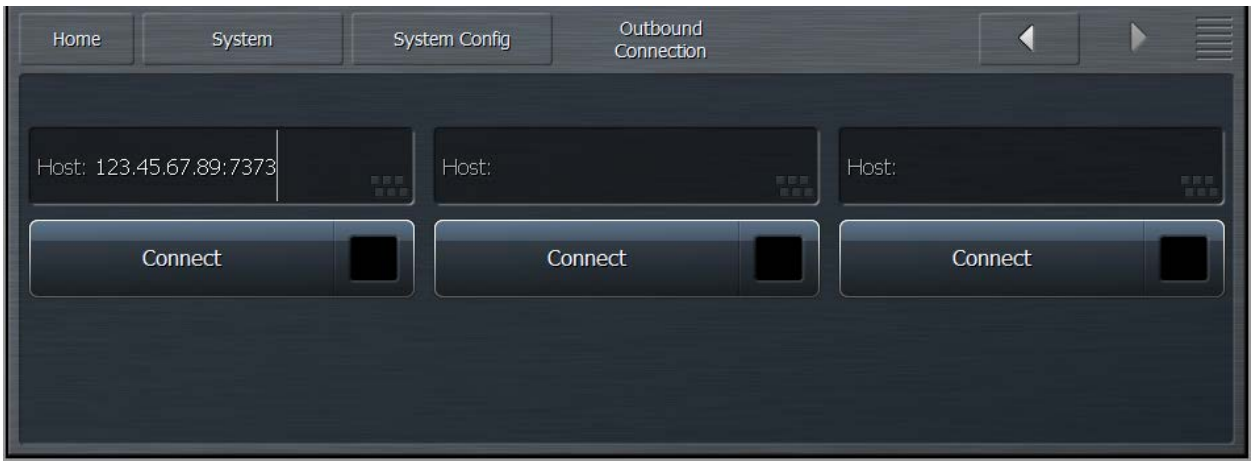
- Selecting **Apply** puts any changes you have made to these parameters into effect after a few seconds.

Outbound Connection Menu

Normally, an instance of NfRemote running on a remote computer initiates the connection to the host PC running Omnia.9 (“inbound” connection). However, there are some situations where it is more appropriate for Omnia.9 to initiate the connection to an instance of NfRemote on a remote computer (“outbound” connection), which is accomplished using the **Outbound Connection** menu.

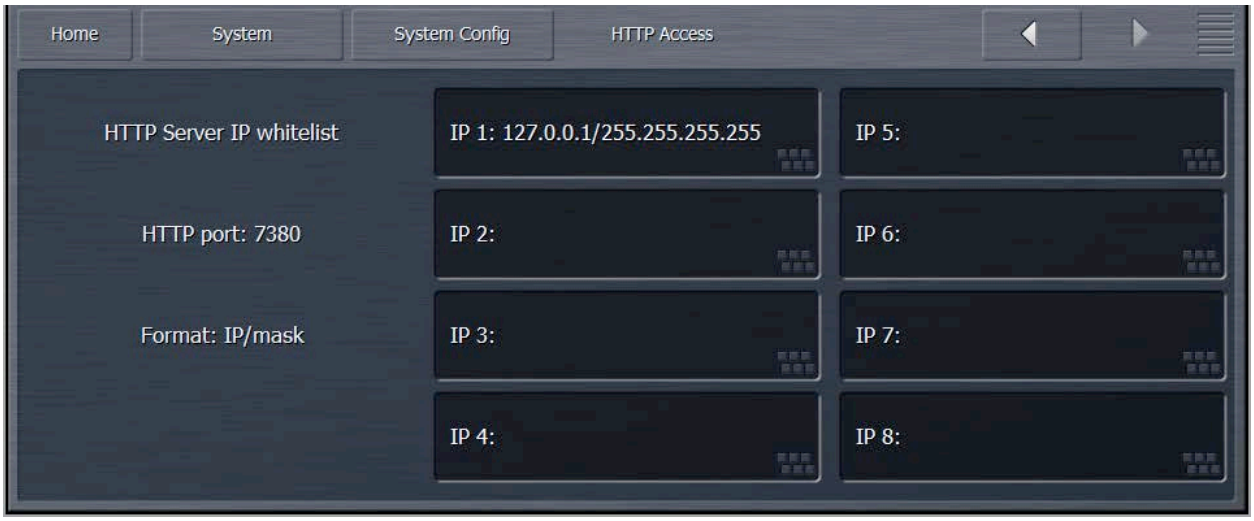
One example of how this can be used is for technical support. By creating an outbound connection, you are connecting to the support engineer’s NfRemote computer which in turn allows them to control your Omnia.9.

In such a situation, the support engineer would provide an IP address (or host name) and a port number separated by a colon (123.45.67.89:7373 for example). Because IP addresses are commonly dynamically allocated, using a host name is the preferred convention.



HTTP Access Menu

The **HTTP Access** menu allows you to create a “white list” of allowable IP addresses belonging to network resources that need access to the Omnia.9, such as automation play-out computers.



- Enter the IP address and subnet mask information using the following example as a guide: 192.168.1.0/255.255.255.0 (The beginning of the IP range followed by the subnet mask, separated by a forward slash).
    - ***Note:*** *You may enter an IP address without a mask to allow only that specific IP address.*

SNMP Menu

The **SNMP** menu provides the means to enter the information necessary to facilitate communication between Omnia.9 and your SNMP manager. It supports SNMP versions V1 and V2c.

- The **SNMP Enable** control enables and disables SNMP. Note that SNMP must be disabled in order to make changes to this section.
- The **Communities** and **Trap Sink** fields accept the community names and IP addresses or names of the trap receiver.

- The **Contact** field accepts the e-mail address of the designated contact.
- Information entered in the **Location** field appears on the front panel display and on remote connections and makes it possible to quickly identify which particular unit you are viewing. This is especially convenient if you are monitoring more than one Omnia.9 simultaneously.

The Omnia.9 MIB file is available via the built-in HTTP server on the SNMP Test Page which can be accessed from any white-listed computer on your network.

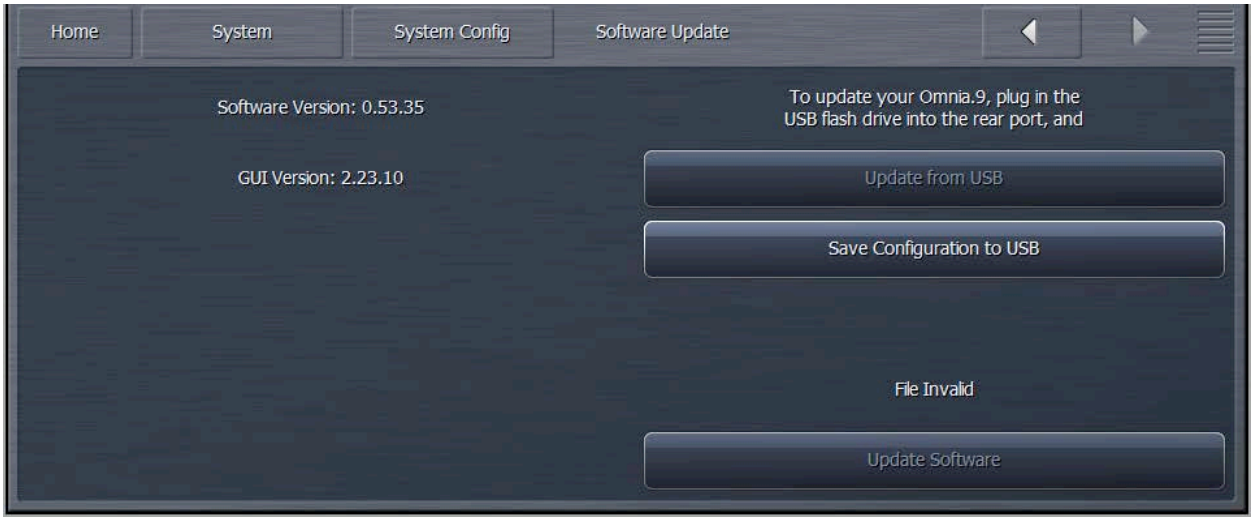
Enter the IP address of Omnia.9 followed by the port number and /SNMP as follows, substituting your IP address: http://192.168.1.1:7380/SNMP

A Test Mode is also provided to help setup and verify proper SNMP configuration and communication.

- ***Note:*** *Please bear in mind that when test mode is enabled, no auto-generated SNMP traps will be sent and any GETs will return the test value, not the actual value.*

Software Update Menu

The **Software Update** menu displays the current version of the Omnia.9 processing software and the GUI software. Software downloads are available from the Omnia website and can be downloaded to an external USB drive.



- Tapping the **Update from USB** button will prompt the Omnia.9 to search the USB drive for the appropriate software and begin the installation process. Updating software WILL take the Omnia.9 off the air – be sure to switch to your backup processor before beginning the update.

- If you are using the Omnia.9 remote software, you will also find an option to **Upload Software**, a handy feature that lets you update the software on the main unit remotely without making a trip to the transmitter site if your Omnia.9 is not located at the studio.

- The **Save Configuration to USB** feature allows you to back up your current configuration – including input and output settings, levels, audio routing, display presets, calibrated speaker presets, and processing presets. Beyond its usefulness as a backup utility, this is also a great way to carry over and duplicate your custom settings on another Omnia.9.

Backup Menu

The **Backup Menu** appears as an additional System Config item *only when you are connected to Omnia.9 via the NfRemote software, not when viewing the front panel display,* and allows the entire configuration of the unit to be saved to your PC in a single .zip file. It also allows a previously saved configuration to be uploaded to the Omnia.9.

This configuration “profile” includes factory and user-created processing, Undo, I/O presets and other configuration information.

Should you wish to “clone” your Omnia.9 you can do so simply by uploading the file to the second unit instead of configuring each parameter individually, rather like the concept of creating an “image” in computer terms. This is also handy if you (or someone else) accidentally changes something and isn’t sure of the original settings, as uploading a known good configuration can immediately get things back to normal similar to using a “restore point” in PC terms.

- The **Backup (Download) Configuration** button saves the current configuration to your computer. Selecting it opens up a Windows Explorer window allowing you to name and choose the location of the saved file.

- The **Restore (Upload) Configuration** button uploads a previously saved configuration to Omnia.9. Selecting it opens up a Windows Explorer window allowing you to navigate to the file on your computer and select it. A confirmation message will appear asking you to verify the upload.

  Note: *This will temporarily take Omnia.9 off the air and disconnect the remote connection while the configuration file uploads and the unit reinitializes.*

- The backup configuration file contains IP-related information and the password belonging to the unit that created the file. The **IP Configuration** and **Password** drop-down menus let you decide whether or not this information will be uploaded to the unit being restored.

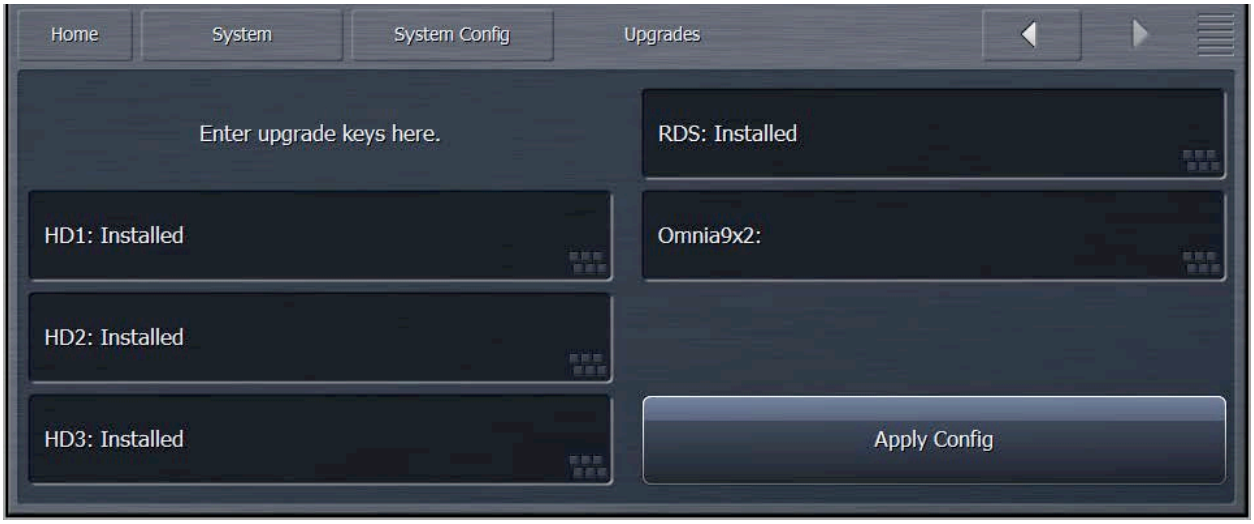
  Selecting “Retain” for the IP Configuration (the default choice) ensures the IP settings in the unit will be retained and NOT overwritten by those in the backup file. Whatever settings are already in the unit receiving the upload will be preserved. Selecting “Override” will take the IP settings in the backup file and apply them as part of the restoration process.

  Likewise, choosing “Retain” in the Password menu will keep the existing password stored in the unit while “Override” will apply the password stored in the backup file.

  Generally speaking, if you are working with a single Omnia.9 and need to bring it back to a known good configuration, choose “Retain.” If you are copying a custom configuration to another Omnia.9 and want to avoid potential IP conflicts (like duplicate IP addresses) or uploading an unknown password, choose “Override”.

Upgrades Menu

You can add options and upgrade your Omnia.9 at any time without the need to purchase new hardware. Please call Omnia support for more information.


Home
System
System Config
Upgrades
Enter upgrade keys here.
RDS: Installed
HD1: Installed
Omnia9x2:
HD2: Installed
HD3: Installed
Apply Config

Chapter 19
Getting the Sound You Want

“One way or another, I’m gonna getcha.” - Blondie

Getting the Sound You Want

Quality v. Loudness

Omnia.9 is capable of providing sound quality superior to any other processor available today, and is equally capable of being louder than the competition, too.

If loudness is your primary goal, you will find that you can match the level of your current processor while getting a much cleaner on-air sound. If high-quality audio is your goal, you will be able easily achieve that goal and get the extra benefit of increased dial presence.

Omnia.9, more than any other processor, minimizes the impact of the classic “quality v. loudness” trade-off by employing processes like “Undo” and an advanced psycho-acoustic distortion-masking clipper, but bear in mind that NO processor can eliminate that compromise completely.

The trade-off between quality and loudness is still determined primarily by the settings of the Limiters and Clippers. Both processes can add to dial loudness, but each does so in a different way, with different-sounding results (and, if used to excess, different sounding artifacts).

The added short-term density provided by peak limiting can still make audio sound dull or overly-dense and create intermodulation distortion, and a little still goes a long way. The amount of limiting action is somewhat dictated by the program material itself. Audio that is already dense and has a high average level – even after being processed by Undo – will still cause less peak limiting than material that is more open with lower average levels and higher peak levels.

For example, almost any poorly mastered current CD that’s already been squashed down and has only a few dB’s of dynamic range already is not going to get the limiters moving – but a well-mastered Steely Dan song will!

Excessive clipping, on the other hand, creates harmonic distortion and can make things sound “edgy” or “torn.” It is imperative to remember that even when all-out loudness is your goal, *there will come a point when driving the clippers harder will not create additional loudness but will create more distortion*, and there is no benefit to going beyond that point.

Achieving a High Quality Sound

When all-out loudness isn’t your primary processing goal, and you are willing to give up just a bit of dial dominance in the name of quality, here are some suggestions to help you achieve that goal:

- Reduce the Clipper Drive (FM core) or Final Limiter Drive (HD and Streaming cores) in 0.25dB steps until you reach the point where the quality no longer dramatically improves, but you’re losing too much loudness - then go back up a notch. It’s surprising how much a small change can open up your sound without giving up much in the way of loudness.

- Reduce the level of the Band Mix section, especially if you have increased the output of one or two particular bands to achieve a particular sound.

- Raise the threshold of the Multiband Limiters to keep the audio from hitting the limiters as hard or as often. (You may need to lower the Band Mix level to keep from driving the final clipper too hard when making this adjustment).

- Lower the targets of the Multiband AGC compressors

- Use slower attack and release speeds in the Input AGC, Wideband AGC, and Multiband AGC sections.
- Use “looser” ratios in the Input AGC, Wideband AGC, and Multiband AGC sections.

Achieving Loudness

If loudness is an important processing goal, and you are willing to accept more processing artifacts and give up some quality, here are some suggestions:

- Use “tighter” ratios in the Input AGC, Wideband AGC, and Multiband AGC sections.
- Use faster attack and release speeds in the Input AGC, Wideband AGC, and Multiband AGC sections.
- Raise the target of the Multiband AGC compressors.
- Lower the threshold of the Multiband Limiters. (You may need to raise the Band Mix to compensate for the additional gain reduction this produces in the limiters).
- Increase the overall Band Mix level.
- Raise the Clipper Drive (FM core) or Final Limiter Drive (HD and Streaming cores) in 0.25dB steps until advancing the control no longer yields additional loudness, only more distortion, and then back off a notch.

Spectral Consistency & Equalization

Stations often want to create their own “signature sound” on the air with a spectrally consistent output without regard to the frequency balance of the original source material.

There are basically three ways to alter the spectral balance of your sound with Omnia.9, and each provides a different end result: The **Parametric Equalizer**, the **Multiband AGC Targets**, and the **Band Mix** control. Adjustments to each section can produce somewhat similar or very different outcomes depending upon a variety of factors.

- The **Parametric EQ** is a very versatile and powerful means by which to shape your sound. You can set up a shelving EQ to create low bass “slam,” set up a broad, gentle cut to the high-mids to smooth out horns or female vocalists, or add some “air” or “sparkle” to your sound by adding a bit of a boost to the very top of the spectrum.

  Because the Parametric EQ is located fairly early in the processing chain and ahead of the Multiband AGC and Limiters, these processing sections are likely to make some attempt to compensate for large changes in the spectrum. However, because the crossover slopes of the multiband processors are relatively broad, the Parametric EQ can have more impact than you might expect.

  Finally, remember that EQ is a *static* process. That is, it increases or reduces gain to a particular part of the spectrum irrespective of program content. In other words, if you apply 8dB of bass boost it is applied to *all* incoming audio whether it is bass shy or bass heavy.

- Adjusting the **Multiband AGC Targets** can have a very significant effect on the spectral balance of your sound as well but there are important factors to consider when adjusting these controls. For example:

- Raising the target of a particular band can make the audio within that band louder (providing increased gain) but this can also slow down the release rate if Progressive Release is employed, as Progressive Release is driven by the current amount of gain in that band.

  The opposite is true when lowering a target. Doing so can make a particular band softer (providing decreased gain) but can result in an accelerated release rate when Progressive Release is used.

- Since raising the target increases gain, doing so means that audio in a particular band may not be increased sufficiently if the source material is lacking in that part of the spectrum. For example, if the source material lacks brightness and the target of the top bands is raised too much, there may not be enough “room” in those bands to sufficiently increase their output.

  The result may be spectral inconsistencies from source-to-source. If creating a consistent spectral signature is important, this may be problematic. If, on the other hand, your goals lean more toward preserving the spectral balance of the original material, this could be advantageous.

- Making adjustments to the **Band Mix** will also influence the spectral balance, but since this is the final point in the processing chain before the Final Clipper (FM core) or Final Limiter (HD and Streaming cores), any peaks that result from adjustments made here will be dealt with only by these more aggressive processing stages. While it is not always a bad idea to increase the output level of a particular band, depending upon the sound you are trying to create, you may have better results by decreasing the output of the rest of the bands by that amount instead. Or, you may instead wish to make the adjustments to suit your tastes and then reduce the overall Band Mix level.

The Multiband AGC Target and Band Mix controls can be used together to help fine tune your sound.

For example, let’s say you are using a 6-band preset and you want to create a more dense-sounding mid-range. By lowering the targets of bands 3 and 4, you will drive those bands further toward a state of gain reduction (and increase their release rate when Progressive Release is utilized) but this can also cause them to become softer in the mix if Progressive Release is not used or the source material doesn’t have significant content in those bands. You can compensate for this loss by increasing the gain of those bands in the Band Mix.

Or, let’s say you want an open and dynamic low end, and have raised the targets of Bands 1 and 2 to achieve less compression but now find that the bass seems too prominent in the mix. You can decrease the gain of these bands in the Band Mix section to restore a more balanced sound.

Chapter 20
Factory Presets

Don’t like that preset? No worries.
There are 34 more.

Factory Presets

Omnia.9 contains a good assortment of factory presets created by a handful of folks who are deeply passionate about audio processing and have extensive experience with the product.

Creating a preset takes countless hours of critical listening to a wide variety of music, including hand-picked “problem songs” that contain passages that are known to be difficult for a particular section of any processor to handle. Each preset has been created with a particular sonic goal in mind. Some are relatively simple in structure, while others exploit Omnia.9’s unique processing functions and utilize a few “tricks” to achieve a particular sound.

We have deliberately avoided naming presets by format or genre (with the occasional exception) so you’ll find no “Urban,” “Open Country,” “Rock,” or “Smooth Jazz” badges here. With conventional naming, many presets that would work quite nicely on your station will be overlooked simply because no one would ever think of trying something called “Hot Country” if they were running a Light AC format that needed some extra punch.

Instead, we encourage you to audition each preset, preferably “on the bench” and not on the air at first, to get a feel for each. Listen for a spectral balance that appeals to you first, and then for texture, without much consideration for loudness. Most of the presets (minus the ones specifically created for maximum loudness) have plenty of “room to grow” in terms of loudness, so if you find something you like but it doesn’t seem quite loud enough, don’t summarily dismiss it; instead, try it out and use the suggestions in the “Getting the Sound You Want” chapter of this manual to up the loudness.

Finally, we are often asked how best to create a custom preset “from scratch”. Since all custom presets are initially based upon a factory preset, we recommend building off of “Reference Settings” since it is the most neutral-sounding factory preset and one upon which many of the factory presets themselves were built.

1981A/O92 – by Jesse Graffam

Designed to capture the spirit of one of the most famous analog processing setups of the 1980’s, “1981A/O92” is a 7-band preset that uses tight ratios over threshold in the lowest band for strong consistent bass regardless of source material with looser ratios in the mid-bands to keep vocals and drums open. It also takes advantage of the WB AGC2 in the “Bass Only” mode to deliver an especially solid low end and uses the parametric EQ to “pre-load” the highs which then receive a good dose of fast compression and limiting to deliver a familiar-sounding top end. An excellent, easy-to-listen-to preset for 70’s and 80’s formats.

Barbeque Sound – by Rob Morsink

If you like a lot of “sizzle” with your music, “Barbeque Sound” brings it on and sends the highs out front to be noticed. The multi-band AGC’s use an Infinite:1 ratio under threshold and looser ratios over threshold, providing higher density in lower-level audio and more openness in louder sounds. Fast multi-band release times offer up density and spectral consistency while the WB AGC-2 operating in the “Bass Only” mode gives low-end transients like kick-drums some extra punch.

Big Bottom– by Leif Claesson

As the name implies, a thundering and broad low-end is the hallmark of this 6-band preset. The strong bass is created by a combination of the parametric EQ, the WB AGC-2 in “Bass Only” mode, and a final boost in the Band Mix. Vocals are pushed a bit farther back in the mix in favor of the strong low end, and Infinite:1 ratios in all bands of the multi-band AGC at all times creates a dense and consistent output, conjuring up the general sound of another un-named but ubiquitous processor known for its bass texture and consistency. If there’s bass to bring forward in the music, “Big Bottom” will find it.

Big Iron – by Jesse Graffam

“Big Iron” is a 4-band preset dedicated to the glory days of radio and emulates the characteristics of such notable compressors as the ART VLA and the Dorrough DAP 310. It provides a warm, open, vocal sound and won’t attempt to aggressively re-equalize the original spectral balance of the source material. It makes use of Omnia.9’s multi-stage AGC sections prior to the multi-band compressors as well as the Gain Reduction Override feature in the multi-band section. It’s competitively loud on the dial, but still punchy.

Celeste – by LeeXS

A fast-acting WB AGC and Infinite:1 ratios over threshold in the multi-band AGC’s give “Celeste” a consistent sound on a wide variety of source materials. It’s strong, warm, and round bass texture and smooth midrange make it a good choice for smooth R&B or light AC stations who value long-term listening and an easy sound over all-out loudness.

Classical/Jazz – by Leif Claesson

“Classical/Jazz” is a 3-band preset designed to provide gentle wideband and multi-band dynamics control without interfering with the original spectral balance of the music. It is not designed for loudness, as it utilizes a modest amount of slow multi-band gain riding and minimal final clipping. It has a much wider gain range than corresponding presets in most other processors, yielding excellent consistency and listenability at lower volumes (such as an office setting) or in noisy environments (in cars). This preset works equally well with classical and jazz programming.

Echoes - by Jim Kuzman

This preset was created with openness and dynamics in mind but despite its mission remains competitively loud on average. Very slow multiband attack and release rates, high multiband AGC target settings, and higher-than-normal Gate and Freeze thresholds prevent soft passages from increasing too much and allow short-term dynamics to pass through with plenty of punch. This makes it a good choice for stations who play World or New Age music or for any format where long-term listening is a priority.

Empire State of Processing – by Leif Claesson

Built to answer the question “How loud can a 3-band preset be?”, “Empire State of Processing” relies more on the final clipper to deliver competitive loudness while employing slow attack and release rates and low ratios in the multi-band section for a more open feel. Vocals are warm and full, balanced by a crisp high end.

Eruption 2.0 – by Leif Claesson and Johnny Lundholm

Deep, always-present bass compliments of fast attack and release rates in the lowest band and a touch of intentional wideband “breathing” make the dynamic and punchy preset a great choice for techno, electronic, or highly-produced urban music. “Eruption 2.0” leans heavily on the final clipper to deliver plenty of loudness on-air.

French Kiss – by Leif Claesson

A 6-band preset reminiscent of the type of processing favored in France a decade or two ago, “French Kiss” offers up lots of clean, distortion-free bass and uses the WB AGC2 compressor to intentionally and noticeably pump the audio when the bass kicks in. While less suited for typical commercial formats, it pairs very well with electronic dance music.

Helix – by Jesse Graffam

“Helix” is a 7-band preset that sports a smiley-face EQ curve to deliver a solid low end and sparkling highs, but still provides a nice open mid-range sound. This preset uses the maximum amount of multi-band range, an Infinite:1 multi-band ratio, and a fair amount of high-frequency limiting to deeply re-equalize and re-balance virtually any input.

Imagine Hot Mid – by Rob Morsink

This bright and loud 3-band preset puts and emphasis on mids and highs and employs a fast release time in the WB AGC-1 compressor to keep levels consistent going into the multi-band AGC section which uses light ratios over threshold. A great preset for making vocals shimmer and for bringing out all the details in the upper frequencies.

Jill FM – by Jesse Graffam

A 7-band preset inspired by the eclectic programming of the “Jack” formats, “Jill FM” provides excellent vocal and lyrical clarity and a super-smooth mid-range. This preset uses a tight ratio on the AGC but loose multi-band ratios and heavier multi-band limiting. Carefully designed not to over-process the bass or high end, this is a great choice for stations with a high female demographic or with long-term listening as a goal who still need to maintain a competitive degree of loudness.

Motor City – by Jesse Graffam

A 7-band preset that unapologetically delivers an in-your-face rock sound, “Motor City” gets a little edgy in the mid-range but is never harsh. This preset makes use of Omnia.9’s Wideband AGC2 after the multi-band section, and while it uses a gentle multi-band ratio below threshold, it makes extensive use of tighter ratios in all bands via the Gain Reduction Override feature.

New York – by Jesse Graffam

One of Omnia.9’s loudest factory presets, “New York” uses 6-bands of fast multi-band release times, lots of multi-band limiting, low multi-band AGC thresholds, and a generous amount of clipping to burn a hole in the dial with a very dense, compressed sound. A very generous bass boost from the parametric EQ creates a loud, harmonic-rich bass but never forces its way into the mids or highs. If your market demands maximum loudness, this is a good starting preset that can be backed down in several ways as needed to trade off a bit of that loudness for a cleaner sound.

Northridge FM – by Jim Kuzman and Leif Claesson

“Northridge FM” is a 7-band preset that makes use of the Wideband AGC2 compressor in “Bass Only” mode to deliver lots of bass punch. Loudness is built relying more upon the dynamics section of Omnia.9 rather than the final clipper, specifically through the use of the Wideband AGC1 compressor and the multiband limiters. It is also one of the brightest and “coolest” factory presets in terms of spectral balance and can be made louder if needed by increasing the final clipper drive.

Northridge HD – by Jim Kuzman and Leif Claesson

With the exception of “Plutonium”, all other factory presets have their “HD only” parameters (such as the final limiter and output mix controls) tuned in such a way that choosing the same preset for FM and HD allows for a very close on-air sonic match when receivers switch between the analog and digital signal. With “Northridge”, however, using the FM version of the preset will result in an on-air sound that was too heavy on the highs for HD. Therefore, we recommend stations using “Northridge FM” on the analog side use “Northridge HD” for the HD path.

NYC Attack of the Camclones – by Jesse Graffam

Slightly louder than “New York,” “Attack of the Camclones” provides a huge, tight, dense bass texture, uses fast attack and release times to build density, and has dip in the lower mids to keep male vocals from becoming muddy. It also foregoes any stereo enhancement. A great choice for CHR stations who want high cume and an ear-catching, prominent sound just about guaranteed to win a major-market loudness war!

Orlando – by Jim Kuzman

Smooth and laid back but far from shrinking away on the dial, this 7-band preset provides gentle re-equalization from the multi-band AGC while still maintaining some of the character of the original audio. “Orlando” is competitively loud when fed more contemporary music, but very suitable for jazz and classical stations that desire better spectral balance and dial presence than presets designed specifically for those types of music. There’s plenty of room to build loudness as needed with the final clipper without losing the overall feel of this preset.

Passive Aggressor – by Jesse Graffam

A 5-band preset with a split personality, “Passive Aggressor” is relaxed and dynamic in feel, yet it provides a great degree of spectral control and overall loudness by utilizing Omnia.9’s “Gain Reduction Override” settings. Looser ratios below threshold and very tight ratios above in the low and high bands coupled with very slow multi-band attack and release times make this preset a great easy-to-listen-to choice for stations that place an emphasis on TSL.

Plutonium FM – by Leif Claesson

“Plutonium FM,” the loudest factory preset and the most aggressive of the “atomic” presets, was initially designed to satisfy the specific needs of a large European broadcast group who not only wanted large quantities of bass, but plenty of bass punch and minimal distortion as well. When processing for all-out loudness, there’s little (or no) room left for bass. Heavy bass clipping makes some room, but at the expense of punch. “Plutonium FM” solves this dilemma by employing the WB AGC2 compressor in the “Bass Only” mode and incorporating the Transient Enhance feature. If your needs call for lots of bass and dial domination, “Plutonium FM” delivers.

Plutonium HD – by Leif Claesson

With the exception of “Northridge”, all other factory presets have their “HD only” parameters (such as the final limiter and output mix controls) tuned in such a way that choosing the same preset for FM and HD allows for a very close on-air sonic match when receivers switch between the analog and digital signal. Because of the way in which “Plutonium FM” utilizes a higher-than-normal degree of composite processing, the result was an on-air sound that was too heavy on the highs for HD. Therefore, we recommend stations using “Plutonium FM” on the analog side use “Plutonium HD” for the HD path.

Point Blank – by LeeXS

Slightly more dense and loud than “Jill FM,” “Point Blank” is a 7-band preset that leans more on the multi-band limiters than the final clipper to build loudness. Bright but always clean and well-balanced, this preset delivers good source-to-source consistency without sounding overly compressed or processed. An excellent choice for a light AC station that wants long-term listening but doesn’t want to disappear from the dial or a CHR station that doesn’t mind trading a bit of loudness for dynamics.

Quintessence - by Sam Sergi

This 5-band preset features full, consistent bass and a sparkling high end. Mids are pushed further back in the mix and loudness is made a priority over openness and punch. Fast multi-band AGC settings ensure spectral consistency regardless of the balance of the source material, making it a good choice for formats where the music spans multiple decades.

Radium – by Leif Claesson

Derived from “Uranium-238”, this member of the “atomic” family of presets dials back the clipper drive and loosens up the multiband ratios a bit. The result is a slight loss of loudness but a considerably more open and dynamic sound. That said, this is still not a quiet preset. If you find yourself in a “loud” market and feel like you need to keep up, “Radium” is a great place to start and will likely be as loud on the dial as the competition but with a significantly more dynamic sound.

Reference Settings - by Leif Claesson

“Reference Settings” is the most neutral-sounding factory preset, but that does not diminish its suitability for a wide variety of formats. It has been used with only slight modifications on active rock stations in very “loud” markets with great success. If you have your eyes set on creating your very own custom preset for your station, this is the preset with which we recommend you begin your masterpiece as it is straightforward and doesn’t include any little tuning “tricks” to create a particular effect.

Rustonium – by Leif Claesson and Jesse Graffam

A hybrid of two past presets – Jesse’s “Rusticity” and Leif’s “Plutonium” – “Rustonium” is Omnia.9’s default preset. The bass is always present but punchy, while the high end is bright and prominent but never shrill or edgy. The multi-band attack and release times are relatively slow, but this 7-band preset makes extensive use of Omnia.9’s progressive release control to allow plenty of gain control in each band without the fear of any band getting “stuck” with too little gain. This preset also places the Wideband AGC2 after the multi-band section to build some extra loudness just before the final clipper. A great “as-is” out-of-the-box preset for nearly every contemporary format.

Stacked Boxes – by Jim Kuzman

Remember back when the dial-dominating air chain was made up of a rack full of analog gear? Say, one box for compression and leveling, another pair of boxes with lots of LED’s providing 4-band compression, and a program/peak limiter (maybe from the same folks as the compressor/leveler) – all driving a final limiter/clipper with edge meters and a key-locked front panel? We do too. “Stacked Boxes” pays homage to the not-so-distant past of analog processing.

Stacked Boxes Plus! - by Jim Kuzman

Offspring of “Stacked Boxes,” the “Plus!” version uses six bands of multiband compression and limiting instead of four, providing a similar overall feel as the original but with more refined mids and better source-to-source spectral control.

The Blitz – by Jim Kuzman

Living proof that loudness and high-quality audio are no longer mutually exclusive qualities, this 6-band preset hands over tight, solid bass, intelligible mid-range, an airy high end, and a wide stereo image. Designed to provide the maximum degree of loudness but never at the expense of audio quality, “The Blitz” is a great choice for classic and active rock formats with plenty of room for an extra dB or two on the clipper drive for those who need more loudness. (Thanks, Bill!)

Tokyo – by Jesse Graffam

Born of “Passive Aggressor” and created in homage to the “classic” sound of previous Omnia processors, the 7-band “Tokyo” delivers detailed transients and percussion without sacrificing average loudness. The mid-range is full and round with increased vocal intelligibility, a sound that translates well to smaller speakers and earbuds as well as higher-quality systems. A tightly-controlled low end ensures the bass always shows up for the party.

Trinity – by Leif Claesson

Inspired by the sound of the classic Omnia.3 FM Turbo, this 3-band preset is dynamic and punchy with an open mid-range and a more classic “Omnia” sound. “Trinity” doesn’t use any parametric EQ or stereo enhancement, runs with a very light ratio in the multi-band section, and presents itself very transparently on the air, making it suitable for nearly any format.

Upsidasium – by Leif Claesson

The smoothest and most open of the “atomic” presets, “Upsidasium” is still relatively loud but thanks to very loose multiband ratios, is also extremely open-sounding. Drums and other transient sounds cut through the mix, vocals are dynamic, and the upper high end delivers that “lighter than air” sound (here’s looking at you, Denny!). If your situation permits giving up the last dB of loudness in favor of a sound that’s easy to listen to long-term but you don’t want to sound underpowered on the dial, “Upsidasium” offers the perfect compromise.

Uranium-238 – by Leif Claesson

The second loudest of the “atomic” presets, “Uranium-238” is slightly less radioactive version of “Plutonium FM”. It has a similar sound to its parent preset, but does not utilize the Wideband 3 compressor after the multiband section and employs less final clipping. A good choice if market-dominating loudness is still your goal but “Plutonium” feels too over-the-top.

Zenith – by Jesse Graffam

How much processing can you get away with before things start to sound processed? The 7-band “Zenith” was created to answer that question. Always open and natural sounding in exchange for overall spectral and loudness consistency, this preset lets the music be what it was intended to be – with just a little push in the right direction.

Chapter 21
NfRemote Client Software

Connecting to the other side, but with a slick remote interface instead of a medium and a seance.

Omnia.9 Remote Interface Software

The Omnia.9 remote interface software, NfRemote, is a separate “client” software application that can be downloaded and installed on nearly any desktop, laptop, or tablet PC of reasonably modern vintage running on Windows 2000, XP, Vista, 7 or 8. Versions 2.30.41 and later also offer support for high DPI displays.

With just a few differences, which will be discussed in this chapter, this client software looks and operates exactly like the front panel controls of the Omnia.9 itself (including touchscreen support on PC’s providing that feature) to provide a familiar and feature-rich means of controlling your Omnia.9 remotely. If you can do it on the front panel, you can do it via remote - a feature you’ll appreciate if your Omnia.9 is located in a noisy rack room, at the transmitter site, or even thousands of miles away at a distant station you oversee.

Perhaps one of the most valuable capabilities of the client software is speaker calibration. Since your Omnia.9 already contains a built-in pink noise generator and an RTA, adding your own calibrated microphone to the setup will allow you to perform a calibration of any speaker system – including your studio, control room, rack room, production facility, or any remote monitor point.

You may wonder why we consider this to be such an important exercise when listeners aren’t going to be hearing your station on calibrated monitors. Great question! Yes, listening to your station’s processing on speakers of different qualities in a wide variety of listening environments is important to get a “real world” feel of how things sound – but we feel strongly that having at least one set of calibrated “reference” monitors is absolutely critical to making educated decisions as you adjust your processing.

If you make adjustments based upon what you hear on un-calibrated speakers (from within the Program Director’s car, for example...) every decision you make will be influenced by the inaccuracies of those speakers in that room. Details of how to perform such a calibration are found later in this chapter.

Downloading, Installing, and Configuring the Client Software

Before the client software can be downloaded, your Omnia.9 must be connected to your network and must have an IP addressed assigned to it, a process outlined earlier in this manual. It must also have a password enabled and be HTTP “whitelisted” at least until you connect with the remote.

Connect to your Omnia.9 by entering http://<IP Address>:7380 into the address window of any standard web browser (for example, http://192.168.0.183.7380) You will see a screen entitled “Welcome to Omnia. 9 HTTP Server” with a current version number.

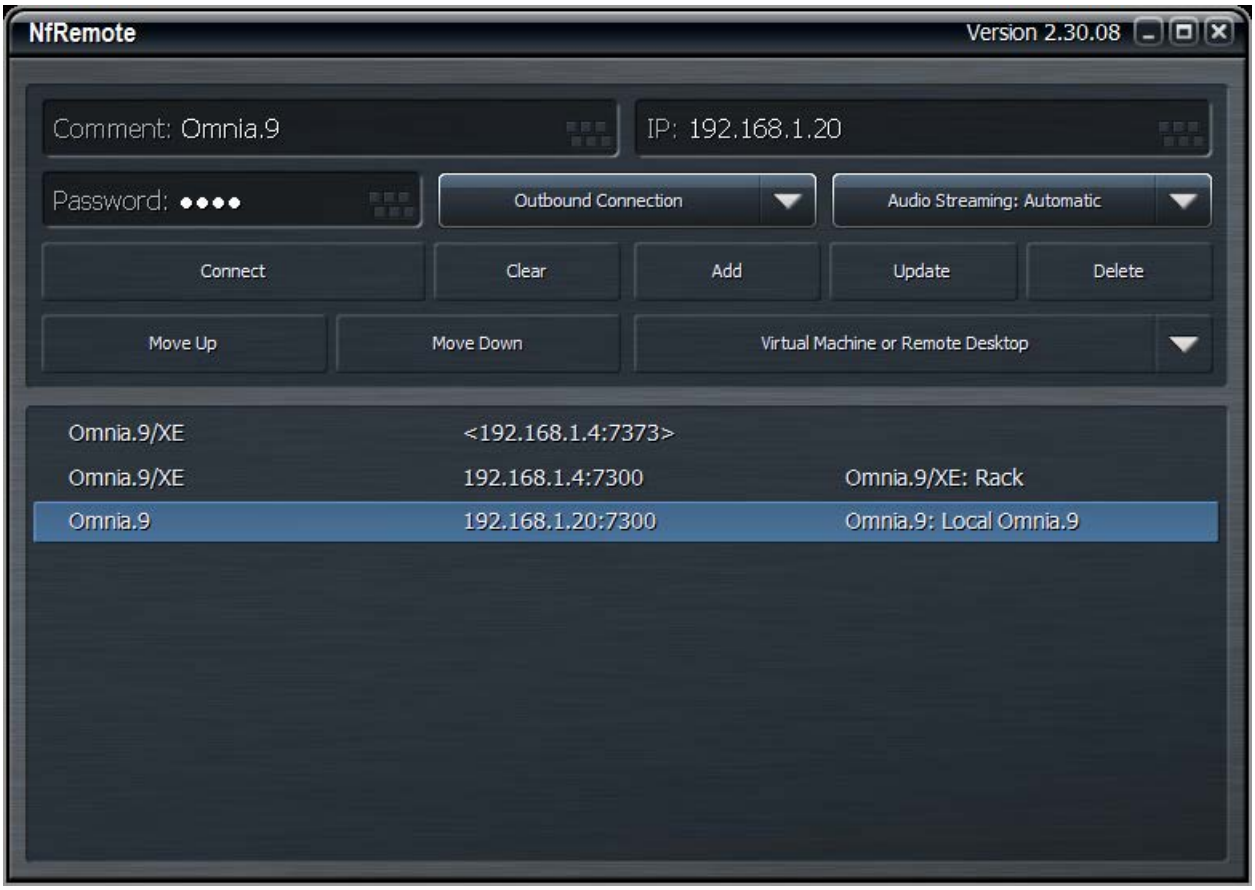
Under the “Downloadables” section, click on the link following “Download Remote Interface.” This should be done each time you update the software in your Omnia.9 to ensure full compatibility between the unit’s software and the remote software.

Some Important Ethernet/Wi-Fi Network Considerations

While the client software itself is not a terribly resource-intensive application, it does place some demands upon your local network. The client allows you to make “live” adjustments to the Omnia.9, observe its meters (as well as other displays such as the oscilloscope) in real time, and on networks with sufficient bandwidth play audio from the Omnia.9 to your remote control PC. The more information the client asks for, the more critical it is to have a robust Ethernet or Wi-Fi connection to the between it and Omnia.9.

Understanding the NfRemote Connection Window

It is possible to connect to any number of Omnia.9's individually or concurrently using NfRemote.



- The **Comment** field allows you to enter a "friendly" name for each device to which you plan to connect.
- The **IP Address** field should contain the IP address of the Omnia.9 host computer.
- The **Password** field should contain the same password established in the Omnia.9.
- The **Connection Type** dropdown menu determines whether the connection is **Outbound** (NfRemote initiates connection to Omnia.9) or **Inbound** (Omnia.9 listens for an incoming connection request from an instance of NfRemote). Note that the IP addresses of inbound connections are enclosed by chevrons.
- It is possible to stream audio from the Omnia.9/ host PC to a remote PC using NfRemote. The **Audio Streaming** dropdown menu enables this feature and determines the type of data compression used to deliver the audio as well as the oscilloscope, RTA, and FFT display information.
  - **Automatic** chooses the best audio format based upon connection speed.
  - **Off** completely disables audio streaming and the client-side oscilloscope, RTA, and FFT displays.

    - **Force Lossy** enables lossy streaming even on connections that are on the border of being too slow and forces lossy streaming even on fast connections.

    - **Force Lossless** enables lossless streaming even on connections that are too slow. This choice is best reserved for local networks with sufficient bandwidth to support it.

- Clicking on the **Connect** button will initiate a connection to Omnia.9 whose IP address is currently displayed.

- The **Clear** button removes all information from the Comment, IP Address, and Password fields.

- The **Add** button collects the current Comment, IP Address, and Password information and carries it to the bottom of the window where it is saved for easy recall later.

- The **Update** button refreshes the list of saved connections.

- Clicking on the **Delete** button will remove the selected connection from the list.

- The **Move Up** and **Move Down** buttons will move the selected connection up or down respectively in the list so that you can sort them in any order.

- The **User Interface Pointing Device** dropdown menu offers several choices for optimizing NfRemote depending upon the type of device you are using.

    - **Local Mouse or Touchpad** should be selected if you are running NfRemote on a local PC or laptop.

    - **Virtual Machine or Remote Desktop** is the correct choice if you are connecting to the computer running NfRemote from another computer. This includes software like Parallels, VMware, Team Viewer, GoToMyPC, Remote Desktop Connection, or a VNC client. Wacom Digitizer users should also select this option.

    - **Local Mouse (Touch Simulation)** allows you to use the finger-friendly layout of the Touch Screen option but with a mouse. It can also be used instead of the Virtual Machine or Remote Desktop option.

    - **Touch Screen** provides a finger-friendly layout optimized for touch screen devices like tablets or all-in-one PC's with a touch interface.

    - **Touch Screen Presentation** operates just like Touch Screen but with a large cursor, making it ideal for situations when you are using a projector for demonstration or instructing a group on how to use NfRemote.

Initiating an Outbound Connection from Omnia.9

Normally, an instance of NfRemote running on a remote computer initiates the connection to an Omnia.9 ("inbound" connection). However, there are some situations where it is more appropriate for Omnia.9 to initiate the connection to an instance of NfRemote on a remote computer ("outbound" connection).

One example of how this can be used is for technical support. By creating an outbound connection, you are connecting to the support engineer's NfRemote computer which in turn allows them to control your Omnia.9.

In such a situation, the support engineer would provide an IP address (or host name) and a port number separated by a colon (123.45.67.89:7373 for example). Because IP addresses are commonly dynamically allocated, using a host name is the preferred convention.

Client-Only Controls

As mentioned earlier, the remote interface looks nearly identical to Omnia.9's front panel display. If you have already familiarized yourself with its controls, you should feel right at home operating it remotely. Therefore, only those controls or features unique to the client software will be explained here.

Joining the Input, FM, Studio Processing, HD, Streaming, Monitor Output, and System Controls on the Home screen is an additional Client Audio menu, which contains additional menus for Client Audio Output, Client Microphone Input, and Client File Recorder. Each menu is discussed in more detail in this manual.

Additionally, the **Save Preset** and **Load Preset** menus for each of the processing cores in the client software have the additional capabilities of being able to save a preset to the location of your choice on the remote PC itself, or load a preset from the remote PC to your Omnia.9. This includes flash drives and external USB drives, which provides an excellent way to back up any custom presets, or easily duplicate those presets on another Omnia.9.

When using the **Load Preset** function, be aware that the preset will be loaded to the **Current Preset** position and will therefore *immediately go on the air*. Additionally, in order for the preset to appear in the list, you must save it using the **Save Preset** function.

Client Audio Output Menu

The Client Audio Output Menu contains additional controls similar to those in the Monitor Output menus of the Omnia.9 (with a few differences) and a TCP Link Status window to provide information about the remote connection.

Patch Point Menu

The Patch Point Menu provides additional controls for enabling Client Audio and SRC, choosing an Output Device, adjusting Client Volume, and setting the Audio Buffer. An additional patch point for monitoring the Client Mic Input is also available.

- When selected, the **Audio Enable** feature allows processed audio to from various patch points within the Omnia.9 to be streamed directly to the client PC. Keep in mind that audio streams require bandwidth, as does displaying patch points on the oscilloscope, FFT spectrum analyzer, or RTA. During handshaking, the remote control software measures the available network bandwidth. If you are on a local network, you will get PCM (NICAM) streaming. If you connect over the internet with sufficient bandwidth, you will get data-reduced streaming. If bandwidth is marginal, certain patch points such as MPX Input/Output (which requires at least 800kbps) or L/R Pre-emph Input/Output (which requires at least 400kbps). will be grayed out. You can still monitor the patch points under “MPX Decoded”, which do the decoding and de-emphasis in the Omnia.9 itself and transport flat audio, which require only 200kbps.

- Enabling the **SRC** control lets the client software dynamically adjust the sample rate of the client playback. If you are experiencing interruptions or dropouts to the client audio stream, enabling SRC will result in a steadier connection, though at a slight cost to CPU usage. Regardless, the client software will automatically determine whether to stream client audio in a linear (uncompressed) PCM format or in a data-reduced format, which, while compressed, can still provide excellent audio quality.

- The client software recognizes any audio output devices (speakers, headphones, sound cards) installed on the remote control PC, and makes them available in the **Output Device** drop-down menu.

- The **Client Volume** slider controls the volume of the selected output devices on the remote PC. This control is duplicated on the top menu of the client software where it is available at all times.

- Depending upon the bandwidth available on your local network, it may be necessary to buffer incoming audio to the client to avoid dropouts by adjusting the **Audio Buffer** control. The range of this control is between 0 and 10,000 milliseconds (10 seconds). The meters on the remote PC will automatically adjust so that they are always synchronized with the client audio as long as client audio is enabled. In addition, you can use the meter delay control in the display section to delay meters further to compensate for any delay occurring after the client PC (such as when using Bluetooth speakers).

- The **TCP Link Status** window provides information about the connection status between Omnia.9 and the remote PC, including Current Ping time in milliseconds, Link Bandwidth in KB/sec, the Audio Format (PCM or Vorbis) of the stream, and Send and Receive rates.

Client Microphone Input Menu

The Client Microphone Input Menu allows you to pick which microphone you’d like to use, a parametric equalizer to create custom EQ curves for individual mics, and the ability to save and recall custom mic presets. There is also a duplicate button to the TCP Link Status window and the Display Settings menu for convenience.

Input Device Menu

The Input Device Menu provides a list of available microphones, including built-in mics and any outboard microphones you may have plugged into the PC running the remote interface software. If you plug in an outboard mic while this window is open, you may need to tap the “Refresh List” button in order for the software to recognize the addition.

Load Preset Menu

This menu operates in a manner similar to the **Load Preset** menu in the various processing cores of the Omnia.9. However, the client software offers an additional **Load From** button that allows you to call up a preset file from the remote PC, including from a flash drive or external USB drive.

Save Preset Menu

Just like the **Load Preset** menu, this operates like its counterparts in other sections of Omnia.9. The **Save To** button allows you to save your presets to a location on the remote PC, including a flash drive or external USB drive.

Client File Recorder

Just as it is possible to record audio from various patch points within the processing chain on the actual Omnia.9 itself, you can also record audio streamed to the client PC. The recorders in the client software work in exactly the same way.

Speaker Calibration

As mentioned earlier, taking the time to calibrate at least one set of speakers to act as your reference monitors is time well spent. In order to perform a speaker calibration, you need four tools:

- A calibrated microphone to capture the audio.
- A pink noise generator to provide audio for measurement (pink noise having an equal amount of “noise power” in each octave).
- A real-time audio analyzer (RTA) to visually display what the microphone is hearing.
- Some means by which to correct for speaker and/or room inaccuracies (such as a parametric equalizer).

Omnia.9 provides three out of the four tools – the pink noise generator, the RTA, and the EQ. All you need to add is the calibrated mic.

Choosing a Calibrated Mic

It is important to understand that you *must* use a *calibrated* microphone designed for sound measurement purposes to perform a proper calibration. Studio or recording mics – even the high-end, high-dollar ones – are of no value when calibrating a system.

You can spend thousands of dollars on a scientific-grade, high-precision calibrated microphone, but the good news is – you don’t have to. Even the least expensive models will provide good quality results and are worthy of consideration.

While we are not in the business of selling microphones, nor do we have any interest in promoting any brand or model over another, we can tell you that Behringer ECM8000 and DBX RTA-M work quite well and can be purchased at local music stores and from various on-line vendors for around $100. If you prefer to connect your mic via USB or Firewire, several manufacturers (M-Audio, E-Mu, and Blue come to mind) offer XLR to USB and XLR to Firewire converters starting at under $50).

Setting Up the Mic

Place the microphone as close as possible to the position you will occupy when monitoring so that it hears what you will hear. In cases where you are calibrating two of the same speakers, and both are placed in similar locations in the room, you can calibrate both the left and right channels simultaneously. If you find yourself in a situation where the speakers will be affected differently by their individual placement in the room – one is suspending from the ceiling in a corner and the other is sitting on a shelf, for example – or one is significantly closer to your monitoring position than the other – we recommend performing an individual calibration for each speaker.

Setting Up the Client Software for Calibration

For the example below, let's assume that you are calibrating your studio monitors, which are being fed audio from the Speaker Output portion of Omnia.9's Monitor Outputs. We will also assume that you are in a situation where you can use the same calibration settings for both speakers. By default, the parametric EQ section is set up in the "common" mode, which means changes made to the left channel will be mirrored in the right channel.

Connect the Client PC and the Calibrated Mic

The first step to calibration is making sure you have a remote connection to your Omnia.9 per the instructions at the beginning of this manual.

Once connected, plug your calibrated mic into the remote PC, install any necessary software or drivers, and establish that it is working properly in Windows.

Set Up RTA and Oscilloscope Display Windows

After microphone installation and setup are complete, you will need to make sure you have the RTA and the oscilloscope set up in a Display Window.

If an RTA is not already visible, select any of the current display windows (Processing Meters, Undo Meters, etc.) to bring up a Display Settings menu. Set up one of the windows to monitor the Client Mic input (for example, Display 3, RTA, I/O, Client Mic Input).

1/3 octave resolution will provide more of a "big picture" overview, while the 1/6 octave will identify more specific peaks and valleys. We suggest an Average setting of 40 and a Target Range of 2.0dB. You will need to adjust the Target and Range controls for your individual situation once you have pink noise running through the speakers at a reasonable volume.

We also recommend setting up an Oscilloscope menu in the same manner so that you can watch for any clipping that may occur should you need to make any significant boost to a particular part of the audio spectrum during calibration. If you see (or hear) any clipping during the process, turn down the **Master Gain** control in the Main 1 menu.

Feeding Pink Noise To the Speakers

From the Home menu, select **Client Audio**, **Client Microphone Input**, then **Input Device** from the **Home** menu of the Omnia.9 client software on the remote PC. Your calibrated mic should be available in the device menu. You may need to refresh the list to make it visible.

Return to the **Home** menu, select **Monitor Outputs**, then **Speaker Output**, then **Main 1**. Turn down the Speaker Volume to a fairly low level, then enable Pink Noise for the left channel. Turn up the Speaker Volume enough to bring the level of pink noise well above the noise floor of the room, and to a level that approximates the volume at which you would normally listen to program material when adjusting your processing. As you adjust the overall volume, you should see the RTA display respond. Orange bars in the Speaker Volume control will indicate when the Speaker Output limiter is active and the Master Gain level should be reduced accordingly.

Final Adjustments to the RTA

Once you have established an overall pink noise level, adjust the **Range** control so that you can see the entire spectrum easily on the display, normally in the vicinity of 70 – 80dB.

Adjust the **Target** control so that the band with the lowest level (not counting very low or very high frequencies that are clearly beyond the ability of the speaker to reproduce) is situated at the top of the

bright red target window. This will allow you to reduce, rather than boost, most of the frequencies with the parametric EQ.

When reading the RTA, it is important to know what peaks and dips are actual representations of "problem areas" with the speaker/room combination and which are microphone placement anomalies. If you move the microphone just slightly and the problem area magically corrects itself, you're seeing such a placement-skewed reading. A little experimentation will quickly reveal this. Once you have finalized the mic placement, it's time to begin correcting things with the PEQ.

Using the Parametric EQ to Smooth Things Out

Methods of equalizing speakers in their rooms vary, but generally speaking, using the fewest number of bands of EQ to achieve the desired result is preferred. Cutting (reducing) frequencies is usually preferred to boosting (increasing) them, although sometimes boosting a certain range is not easily avoided. Remember that there are a total of 12 available bands of EQ available to you – 6 in the **EQ1** menu and 6 more in the **EQ2** menu.

We assume that if you've gotten this far, you have a general idea of how the controls of a parametric equalizer work, but as a quick review:

- The **Gain** control determines how much the specified frequency range is amplified or attenuated, expressed in decibels.
- The **Bandwidth** control determines how wide or narrow a range of frequencies will be affected, measured in octaves.
- The **Center Frequency** control determines what frequency will lie in the middle of the adjustment curve, expressed in Hz.

You will be able to identify where your speakers start to roll off in terms of frequency response (especially on the low end) pretty quickly. You can't overcome pure physics with an equalizer, and small speakers will never reproduce bass with the same authority as larger ones, so there's no point in trying to give a 15dB boost at 30Hz to small monitors in the hopes that you'll get the equivalent of a free subwoofer. (What's frequently more effective with bass-shy speakers is taming the often over-boosted mid-bass that manufacturers dial in in the hopes that you think you have more low end than you do).

As you study the RTA, we recommend identifying and correcting any glaring peaks or valleys over a relatively narrow ranges of frequencies first to take care of any "hot spots." Then, work your way out to making broader changes to the overall curve.

Chasing Your Tail

Speaker calibration can be a frustrating process, especially if this is your first go-around with it. Sometimes it's like squeezing a balloon: When you squish one end, the other end puffs out. So it goes with calibration. Make a boost to one frequency, and the surrounding frequencies go up, too.

Experimenting with the center frequency and bandwidth controls will help, as will a good dose of patience and allotting enough time to do it up right. Your efforts will be rewarded when you play music through your calibrated setup for the first time and wonder if someone swapped out your tired old monitors with something new and much more expensive!

Saving Your Calibration Settings

You can save your calibration settings in the form of a preset by going to the **Save Preset** menu and typing in a friendly name for your file, preferably one that uniquely identifies the speakers and location ("JBL 4312 FM Air").

Tweaking After Calibration

You may notice that while your speakers sound significantly better than they did before you calibrated them, and they are technically much more accurate, they sound a little thin in the low end and a little dull in the highs because of the way the human ear perceives sound at the far ends of our hearing range.

We suggest that instead of making changes to the EQ sections, you use Omnia.9's **Loudness 1** and **Loudness 2** menus to make subjective adjustments. These menus each give you three additional bands of fully parametric equalization.

If desired, they also allow you to adjust at what point on the Speaker Volume control the changes take affect (since our ears are less sensitive to certain frequencies at lower volume levels).

- The **Minimum** slider on each EQ band sets the point on the volume control where the EQ has no effect on the sound.
- The **Maximum** slider sets the point on the volume control where the EQ in that band is in full effect (boosted or cut to whatever gain level you have set).

For example, if the **Minimum** slider is set to -20dB, the **Maximum** is set to -10dB, and the **Gain** is set to minus 5.0dB, equalization will begin to take effect when the volume control is set to -20dB and will be attenuated by 5dB by the time the control is set to -10dB.

If the minimum and maximum values are the same, the loudness controls function as a normal parametric equalizer independent of the volume setting.

Chapter 22
Frequently Asked Questions (FAQ)

Answering your questions before you even ask them.

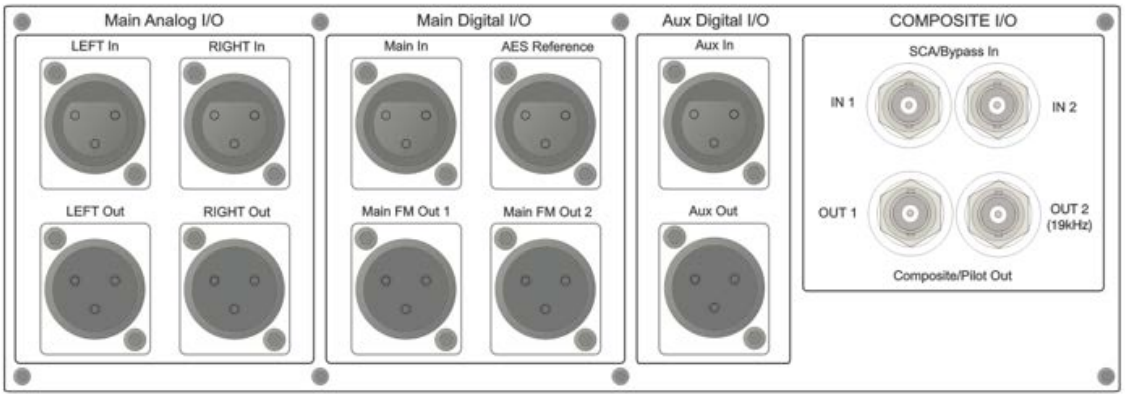
Frequently Asked Questions (FAQ)

How do the physical rear panel inputs relate to the various processing cores?

A fully-optioned Omnia.9 can take in three independent audio sources via its physical rear panel inputs. Each physical input is then assigned to an internal signal path within Omnia.9 in the **System > I/O Options > Input 1/2/3** menus.

Keep in mind that individual processing cores must be enabled, disabled, and configured in the **System > System Config > Processing Cores** menu, and only options that have been purchased and installed in your particular Omnia.9 will be available.

Though the rear panel digital inputs are labeled “Main In,” “AES Reference,” and “Aux In” in an effort to represent a typical installation scenario, they are in fact all identical and interchangeable.



One important thing to understand is how each audio source is “shared” within the unit. Again, using a fully-optioned unit for illustration, audio destined for the FM processor is also shared by the HD-1, Streaming 1, and Studio cores. Audio destined for HD-2 is shared by the Streaming 2 core, while audio for the HD-3 feed is shared by the Streaming 3 core.

Which rear panel output should I use?

The choice of which rear panel outputs to use will depend upon the configuration of your particular plant.

In an all-digital plant where Omnia.9 is located at the studio and feeding AES audio to an STL with AES inputs, output audio should come from the Main FM Out 1, Main FM Out 2, and Aux Out outputs. The source of the processed audio for each of these outputs is determined in the **System > I/O Options > Main Outputs** menu.

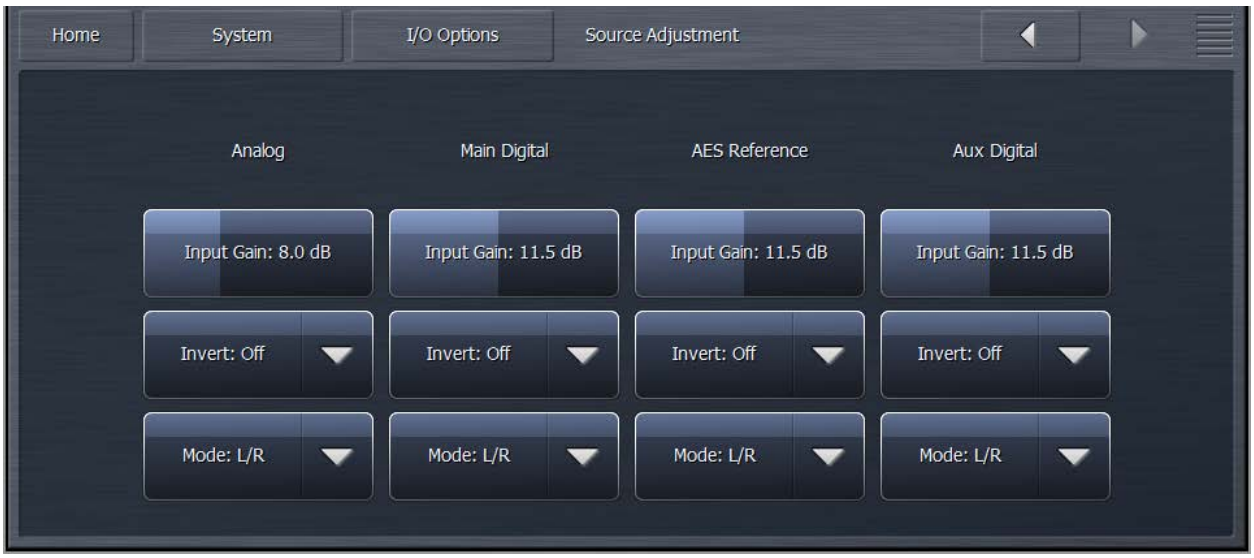
Home
System
I/O Options
Main Outputs
Main FM Out 1: FM Pre-emph L/R
Main FM Out 1 Level: 0.0 dB
Omnia Direct (tm)
Main FM Out 2: HD1
Main FM Out 2 Level: 0.0 dB
AES FM Out 1: L/R Audio
Aux Out: HD2
Aux Out Level: 0.0 dB
AES FM Out 2: L/R Audio
Analog Out: Speaker Out
Analog Out Level: -6.8 dB

For example, the Main FM Out 1 might be set to “FM Pre-emph L/R” in order to output pre-emphasized audio for the main FM channel which will be de-emphasized later in the chain. Main FM Out 2 might be set to “HD-1” to route audio destined for the HD-1 path. Aux Out may be set to “HD-2” for audio being sent to the HD-2 path.

If Omnia.9 is located at the transmitter, one of the two rear panel composite outputs can be used to feed the main FM audio directly to the exciter. This is also true if Omnia.9 is located at the studio feeding a composite STL. In these cases, adjustments to the output are made in the **System > I/O Options > FM Options** menu.

How do I set input levels?

Input levels are set in the **System > I/O Options > Source Adjustment** menu.



How do I set output levels?

If you are using Omnia.9's digital outputs, levels are set in in the **System > I/O Options > Main Outputs** menu.

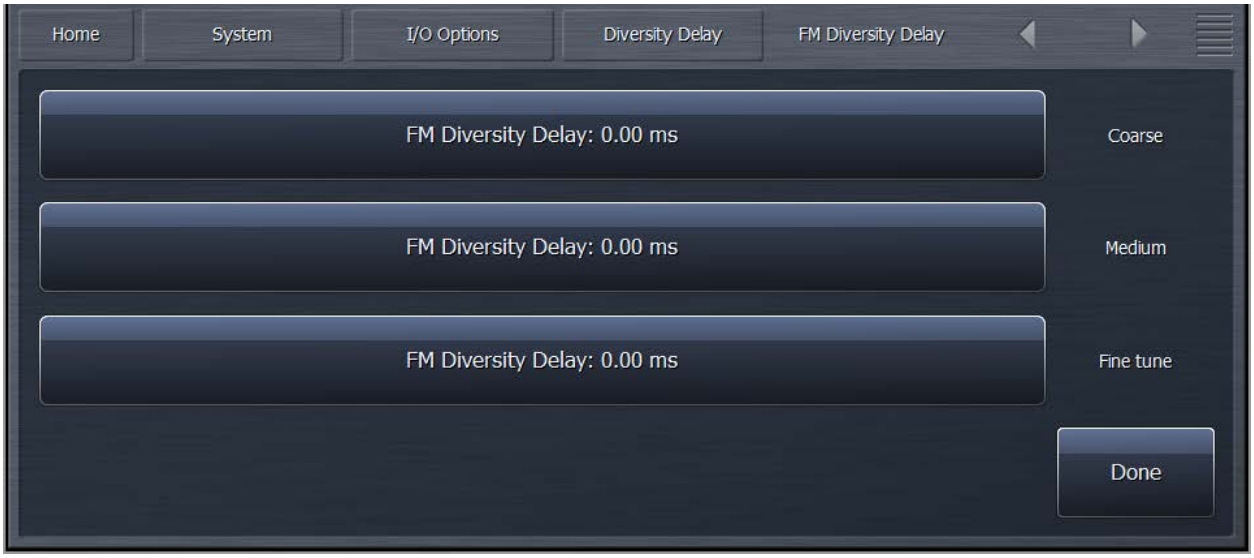
Home
System
I/O Options
Main Outputs
Main FM Out 1: FM Pre-emph L/R
Main FM Out 1 Level: 0.0 dB
Omnia Direct (tm)
Main FM Out 2: HD1
Main FM Out 2 Level: 0.0 dB
AES FM Out 1: L/R Audio
Aux Out: HD2
Aux Out Level: 0.0 dB
AES FM Out 2: L/R Audio
Analog Out: Speaker Out
Analog Out Level: -6.8 dB

If you are using the composite outputs, levels are set in the **System > I/O Options > FM Options** menu.

Where is the diversity delay?

Omnia.9 provides a “diversity delay” so that FM audio can be delayed and time-aligned to corresponding HD-1 audio, ensuring listeners with HD radios will experience a smooth transition when their receivers switch back and forth between the analog and digital signals.

This control has been relocated in this version of the software and is now found in the **System > I/O Options > Diversity Delay** menu. Double-clicking on the slider will bring up three independent sliders for Coarse, Medium and Fine adjustment.



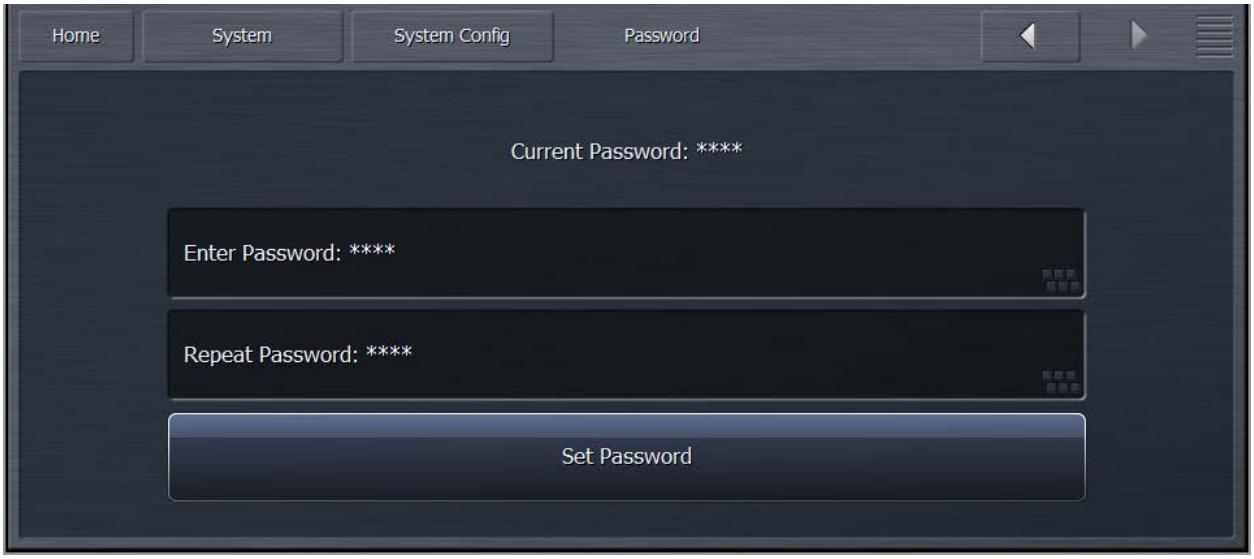
I'm having difficulty getting my Omnia.9 on my local network. I can't "ping" it either.

As a security measure, Omnia.9 is not "ping-able" on the network so the inability to get traditional ping response is not necessarily a sign of a problem.

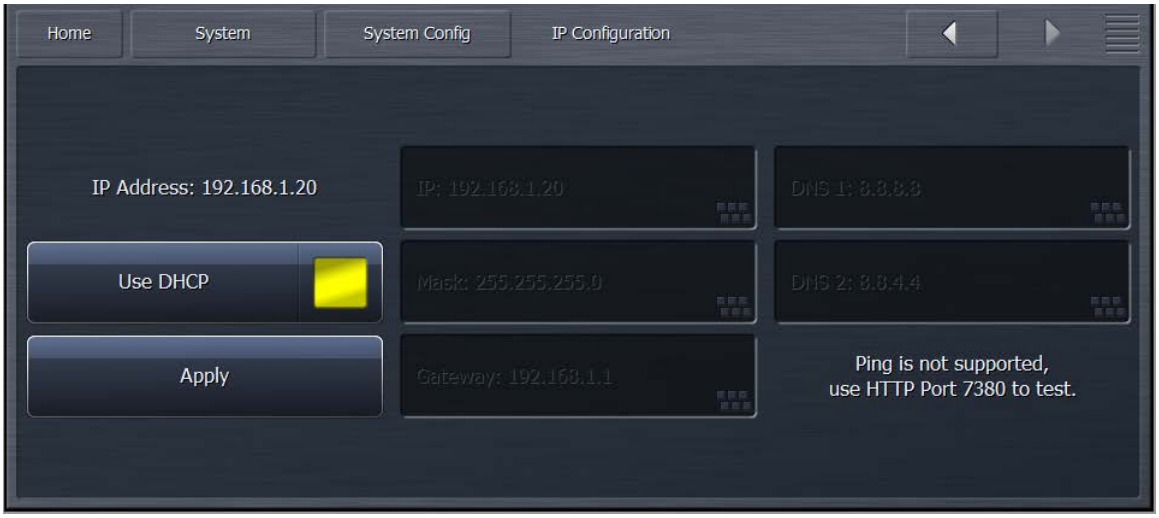
There are two basic conditions that must be met before a remote connection to Omnia.9 is possible:

- Omnia.9 must have a password set up via the front panel.
- Omnia.9 must be connected to your local network and have a working IP address initially assigned to it via DHCP (a static address can be established later).
  - ***Note:*** *It is not necessary to "white list" a computer in order to access Omnia.9 remotely. Any computer running the NfRemote software can access Omnia.9 providing the user knows the unit's password. White listing IS required to access the built-in HTTP server, however.*

To set up a password, navigate to the **System > System Config > Password** menu from the front panel. Enter your password in the "Enter Password" and "Repeat Password" fields and click on the "Set Password" button.



To set up an IP address, navigate to the **System > System Config > IP Configuration** menu from the front panel. Click on “Use DHCP” to enable Omnia.9 to receive an IP address from your DHCP server. If, after a period of 30-60 seconds, the internal loopback address is still displayed, Omnia.9 isn’t communicating with the DHCP servers and there are network issues outside of the unit to explore.



While it is beyond the scope of this manual to provide specific IP troubleshooting advise, we can suggest the following basic steps:

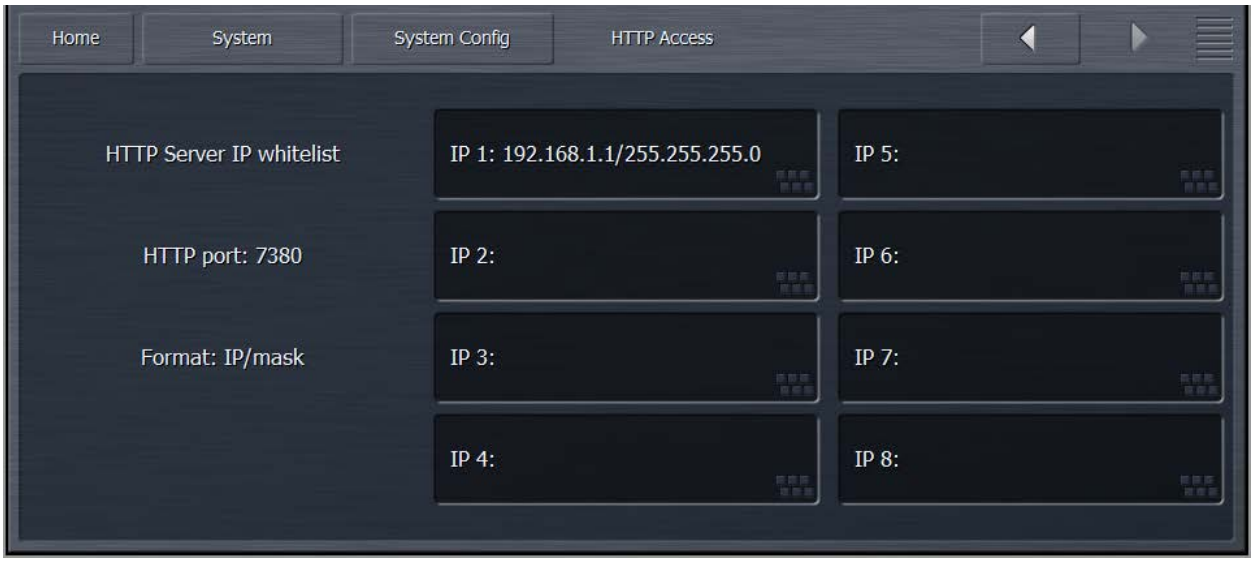
- Try using a different Ethernet cable to rule out that a bad cable is at fault.
- Plug Omnia.9 into a different port on your router or switch to rule out a bad port.
- Plug Omnia.9 into a different router or switch altogether to eliminate a bad piece of hardware.
- Plug another device (such as a laptop computer) into the same port and see if it will communicate with the DHCP server.

- Using a computer that is already known to work on the network, use an Ethernet cable to connect Omnia.9 directly to that computer. In most cases, the computer will act as an ad-hoc DHCP server and attempt to assign Omnia.9 an IP address.

Where do I get a copy of the remote software?

The remote software client (NfRemote) is always available from within Omnia.9 itself and can be retrieved using the built-in HTTP server. Any time you update your Omnia.9 software it is a good idea to update your NfRemote software as well to ensure compatibility.

The computer used to access the HTTP server must be on Omnia.9's "white list" and Omnia.9 must be set up properly on your local network. To place a computer on the white list, navigate to **System > System Config > HTTP Access** and enter the IP address and subnet mask in the format shown below.



Using a web browser of your choice (and the actual IP address of your Omnia.9 to replace the sample address here), enter "http://192.168.1.1:7380". This will bring up the HTTP server home page which contains a link to the NfRemote software. Download, locate and install the software. Once installed, assign a "friendly" name of your choice in the "Comment" field, enter the IP address and password, and click "Connect".

Chapter 23
Signal Path Diagrams

Morbidly curious? Want to look smart in front of co-workers by staring intently at block diagrams?

This chapter is for you.

Signal Path Diagrams

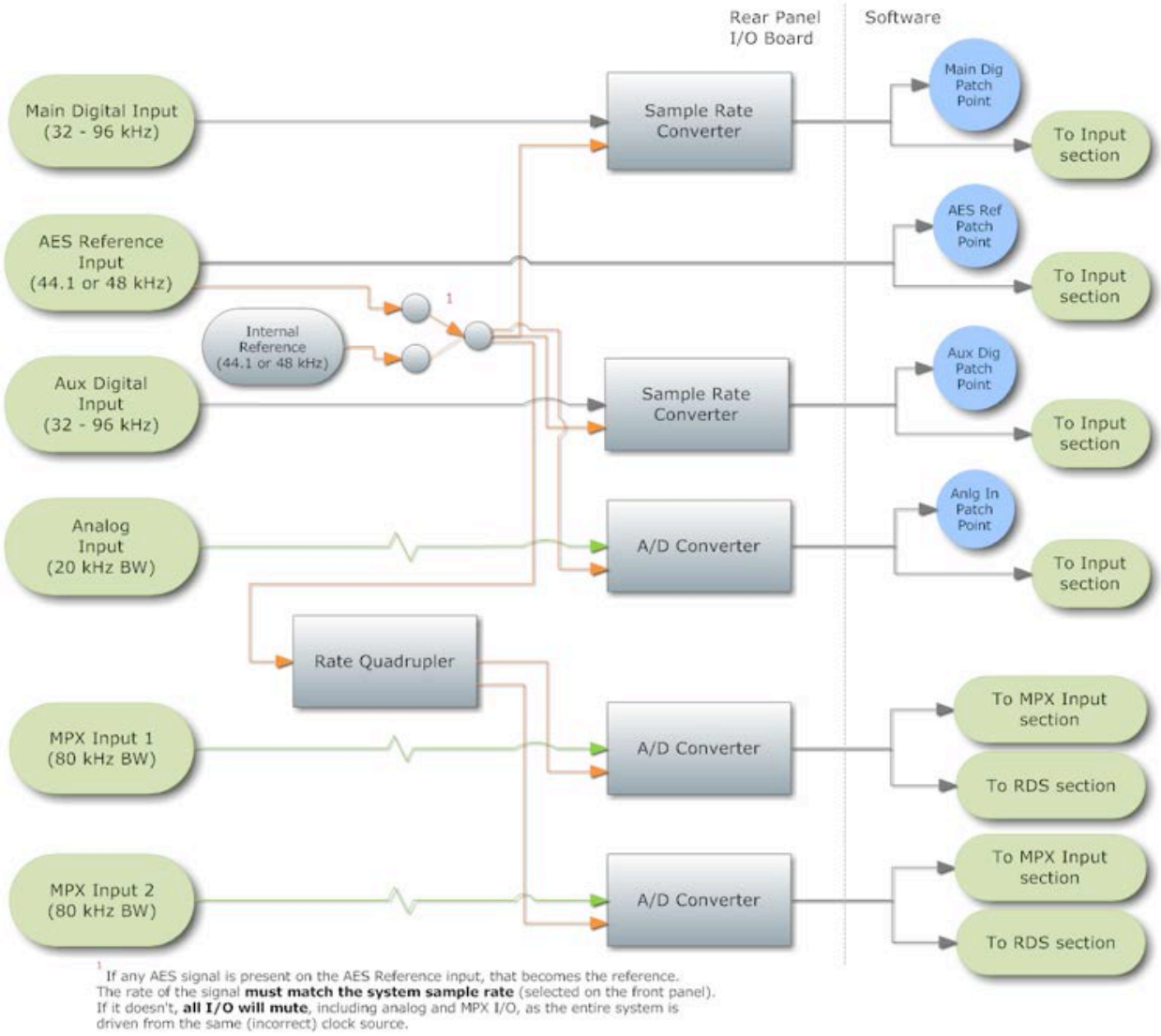
Many users of the Omnia.9 will be content with plugging it in, making the necessary I/O connections, picking a preset, then sitting back to enjoy the amazing aural delights and effortless dial dominance it provides.

Some will want to make changes to achieve a truly custom sound.

Still others will want to explore every nook and cranny of the menu system to discover every available control (there are nearly 4,500 points of adjustment when all features and cores are active – best to pull up a comfy chair and get a pot of coffee going).

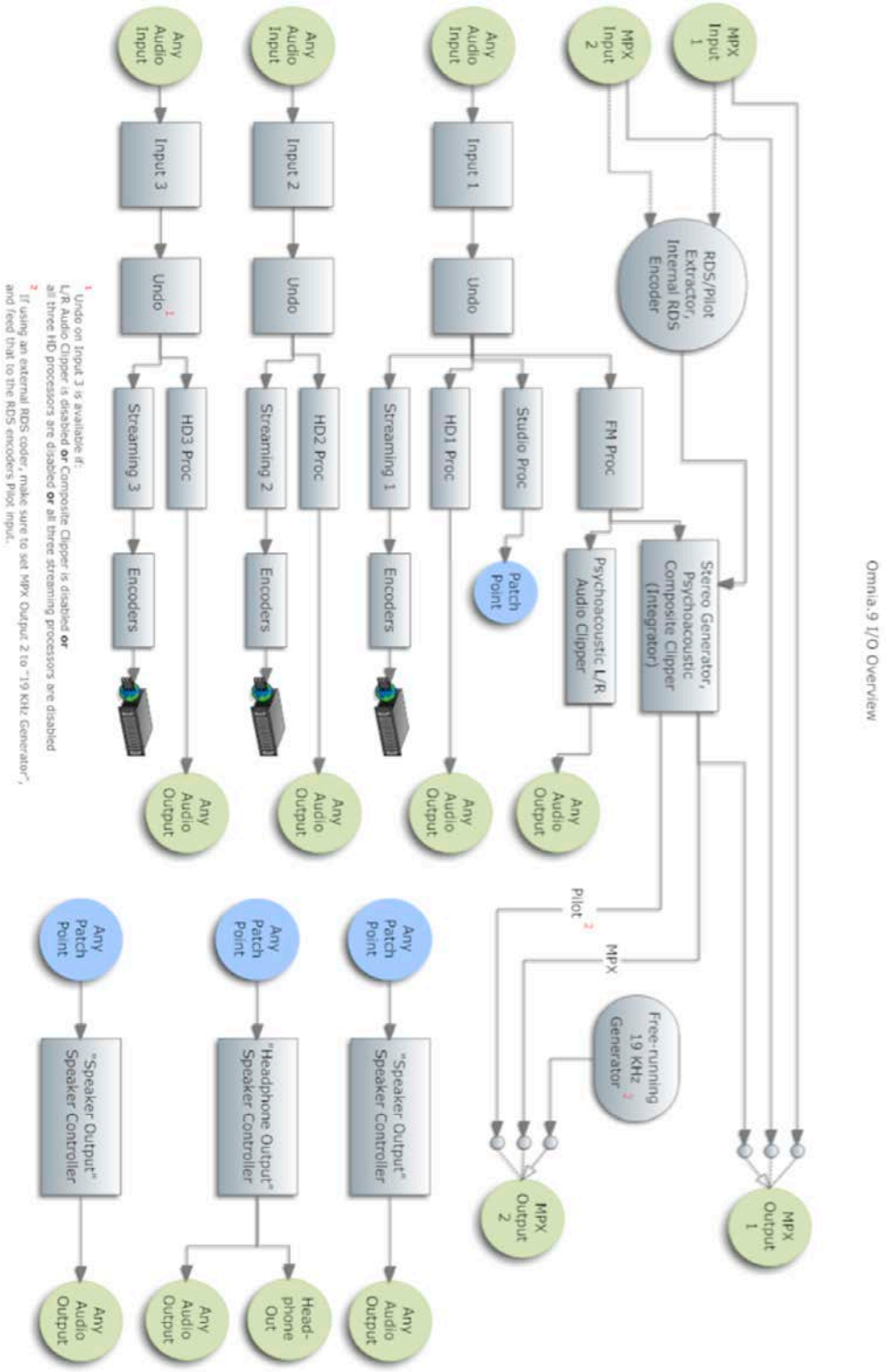
And then there are those who will want to know more about how stuff gets done (you know who you are). It is for that crowd that we have provided the following flowcharts showing various signal paths within Omnia.9.

Physical Inputs

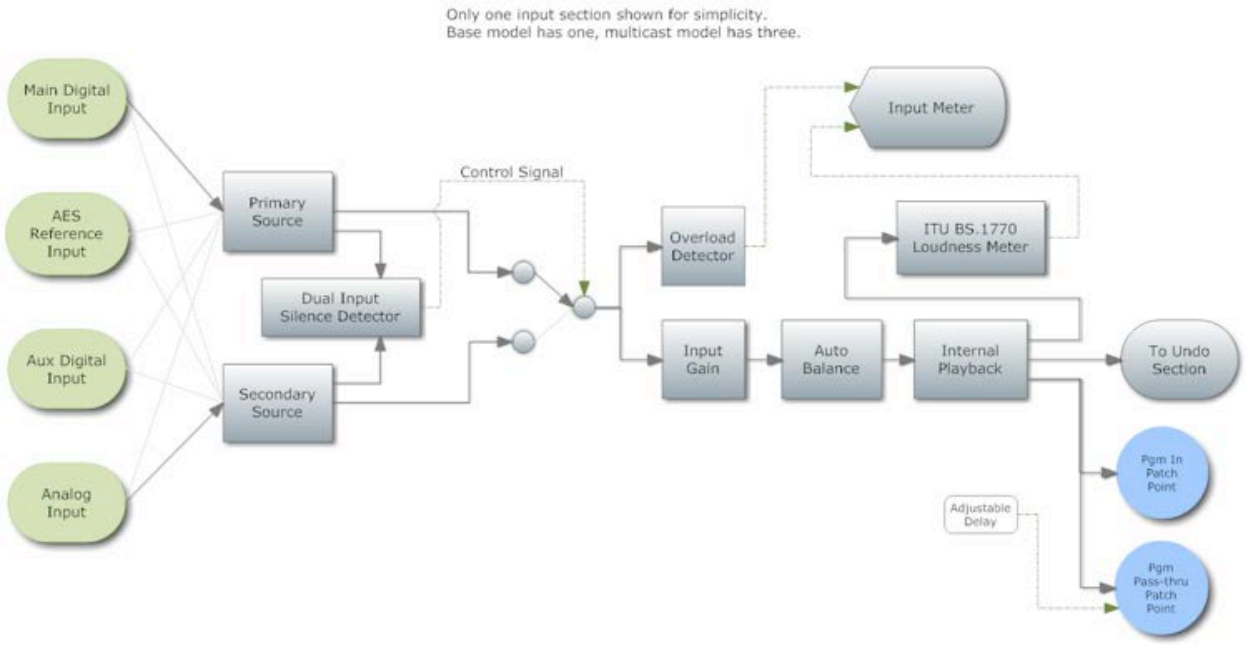


[1] If any AES signal is present on the AES Reference input, that becomes the reference. The rate of the signal **must match the system sample rate** (selected on the front panel). If it doesn't, **all I/O will mute**, including analog and MPX I/O, as the entire system is driven from the same (incorrect) clock source.

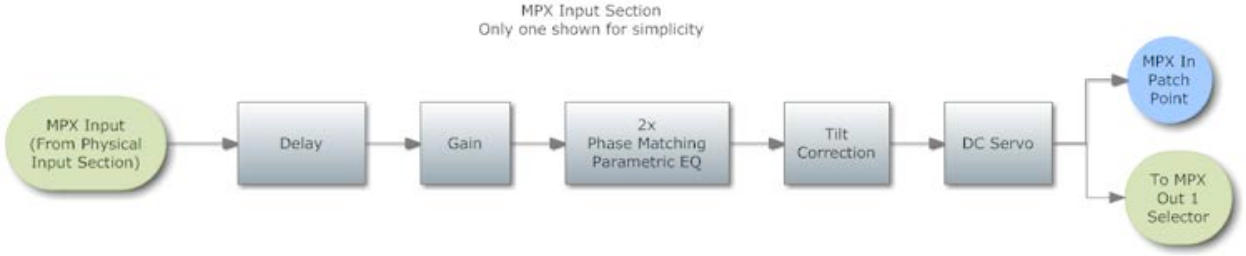
Input / Output Overview


MPX Input 1
MPX Input 2
Any Audio Input
RDS/Pilot Extractor, Internal RDS Encoder
Input 1
Input 2
Input 3
Undo
Undo 1
Studio Proc
FM Proc
HD1 Proc
HD2 Proc
HD3 Proc
Streaming 1
Streaming 2
Streaming 3
Encoders
Patch Point
Psychoacoustic L/R Audio Clipper
Stereo Generator, Psychoacoustic Composite Clipper (Integrator)
Any Audio Output
Pilot 2
MPX
Free-running 19 KHz Generator 2
MPX Output 1
MPX Output 2
Any Patch Point
"Speaker Output" Speaker Controller
"Headphone Output" Speaker Controller
Head-phone Out
1 Undo on Input 3 is available if: L/R Audio Clipper is disabled or Composite Clipper is disabled or all three HD processors are disabled or all three streaming processors are disabled
2 If using an external RDS coder, make sure to set MPX Output 2 to "19 KHz Generator", and feed that to the RDS encoders Pilot input.
Omnia.9 I/O Overview

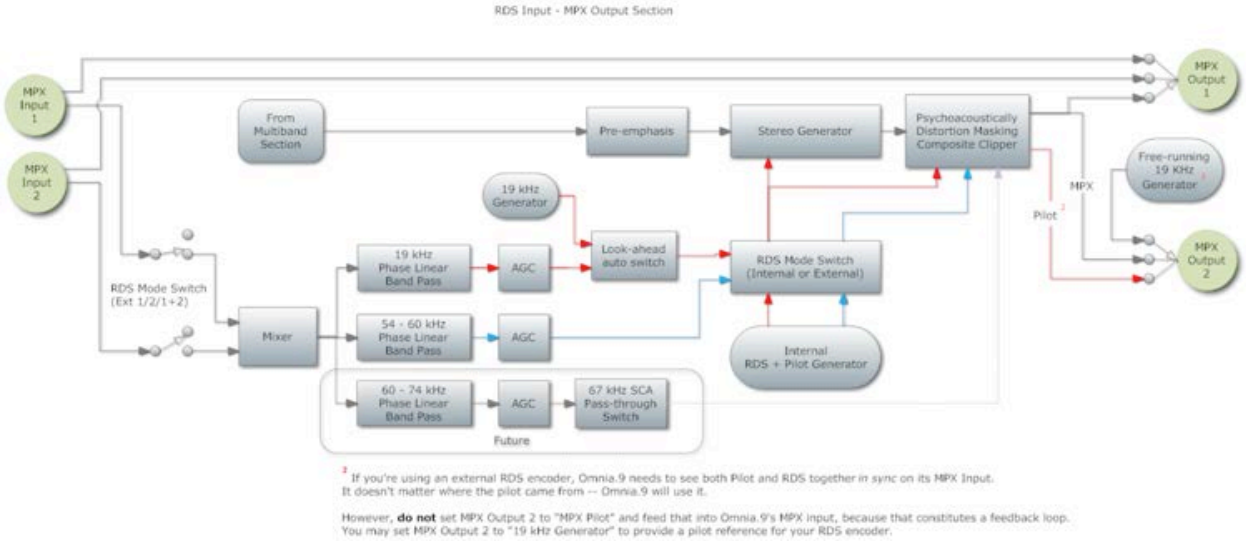
Input Section



MPX Input



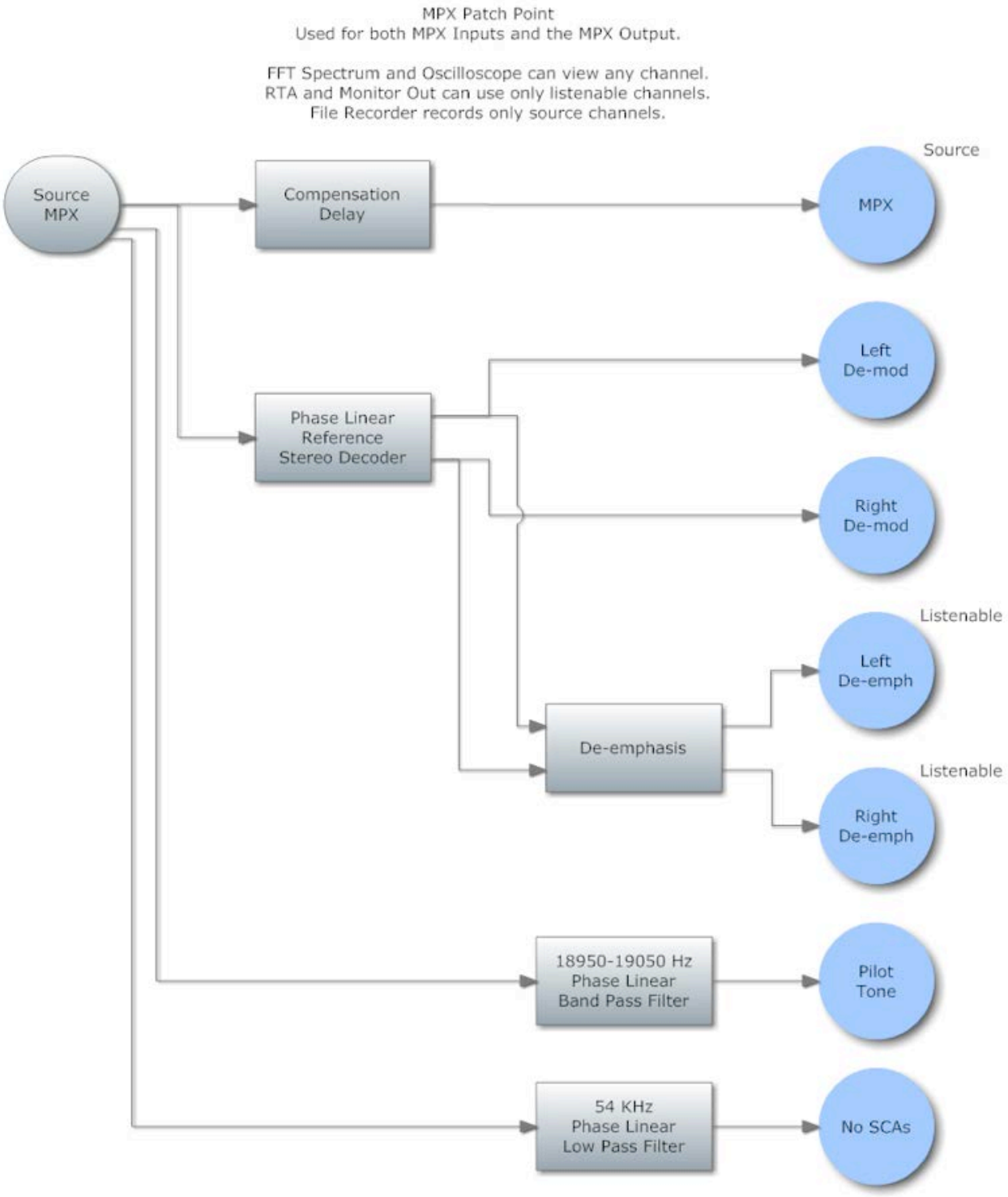
MPX Output



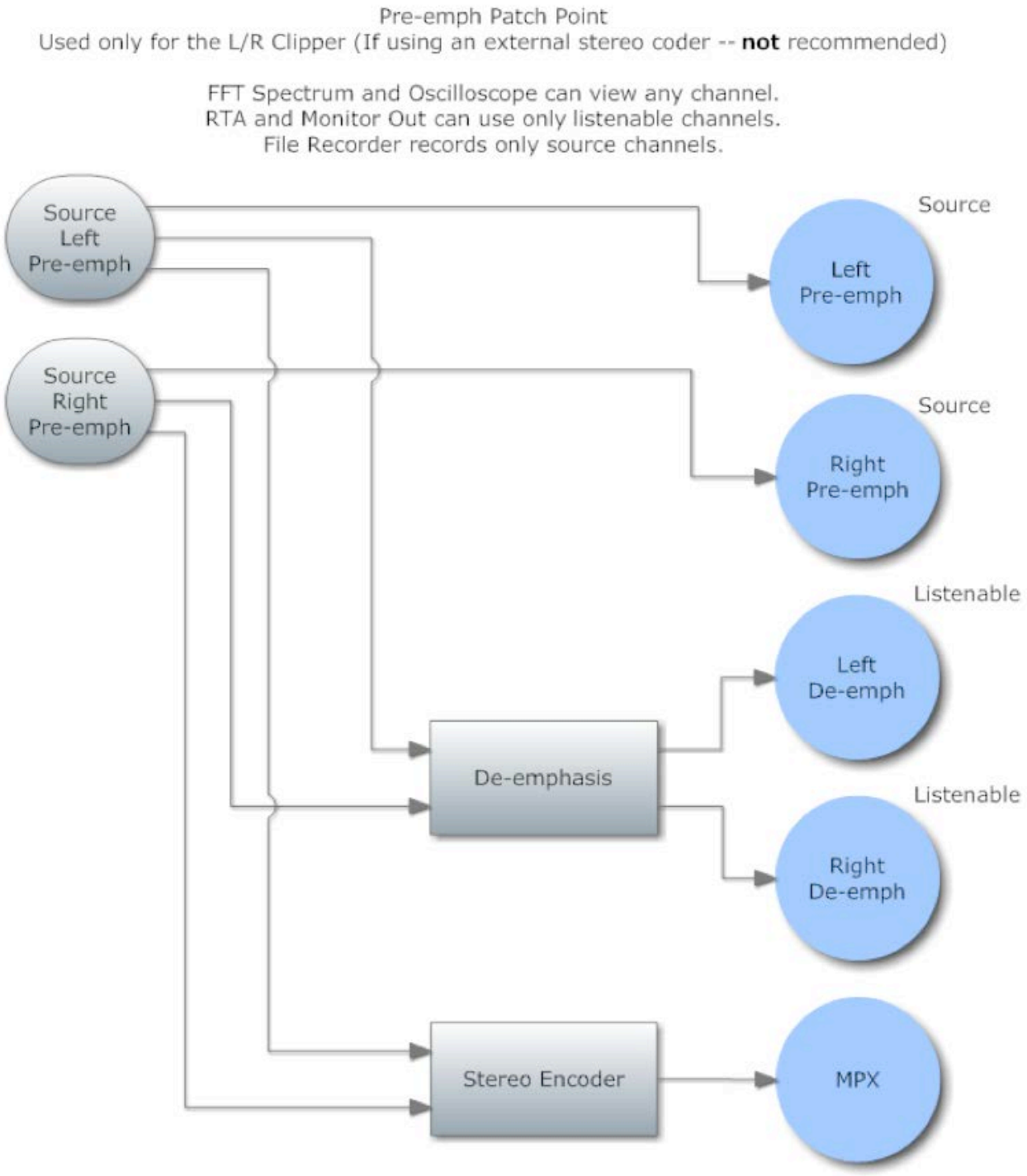
[2] If you're using an external RDS encoder, Omnia.9 needs to see both Pilot and RDS together in sync on its MPX Input. It doesn't matter where the pilot came from -- Omnia.9 will use it.

However, **do not** set MPX Output 2 to "MPX Pilot" and feed that into Omnia.9's MPX input, because that constitutes a feedback loop. You may set MPX Output 2 to "19 kHz Generator" to provide a pilot reference for your RDS encoder.

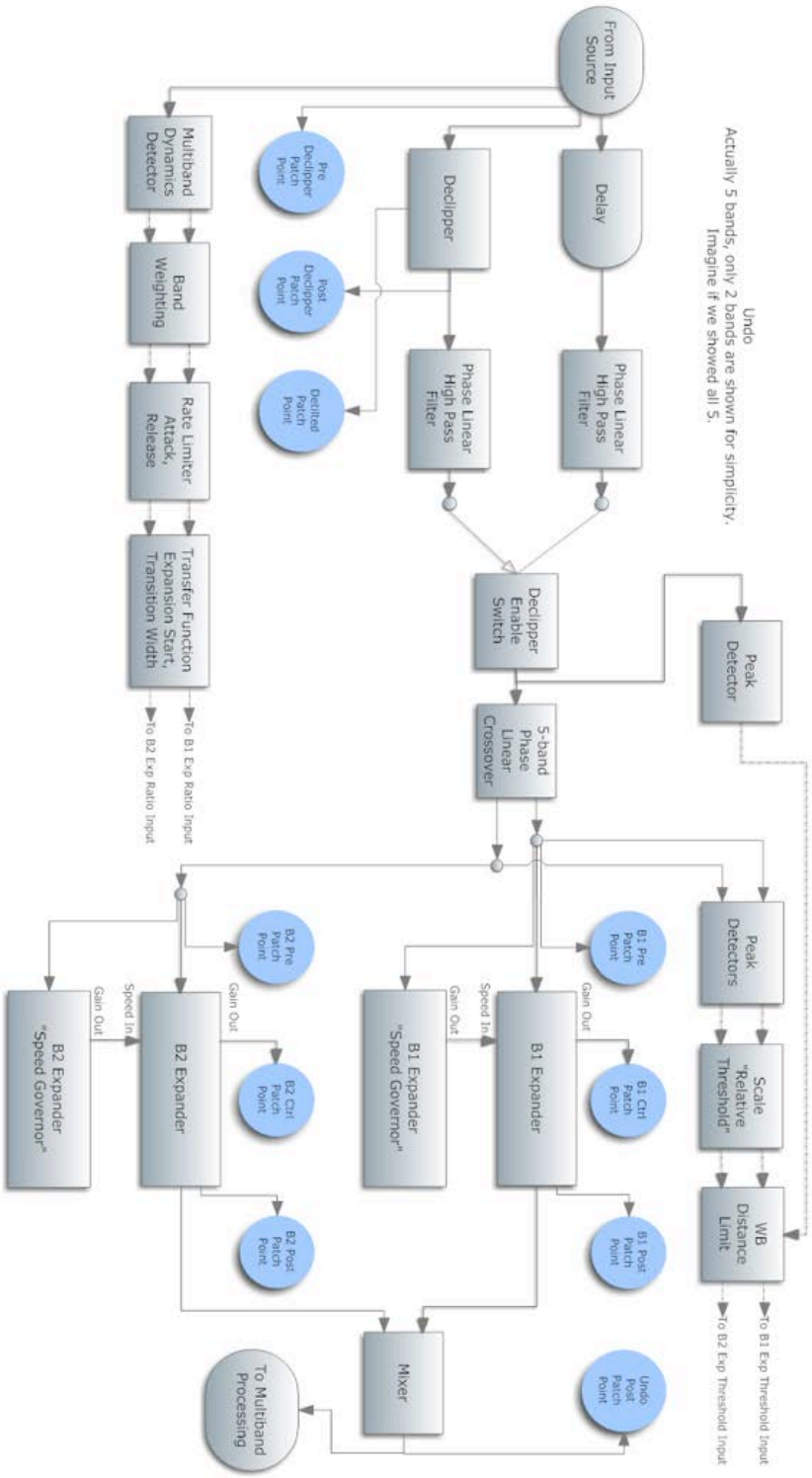
MPX Patch Point



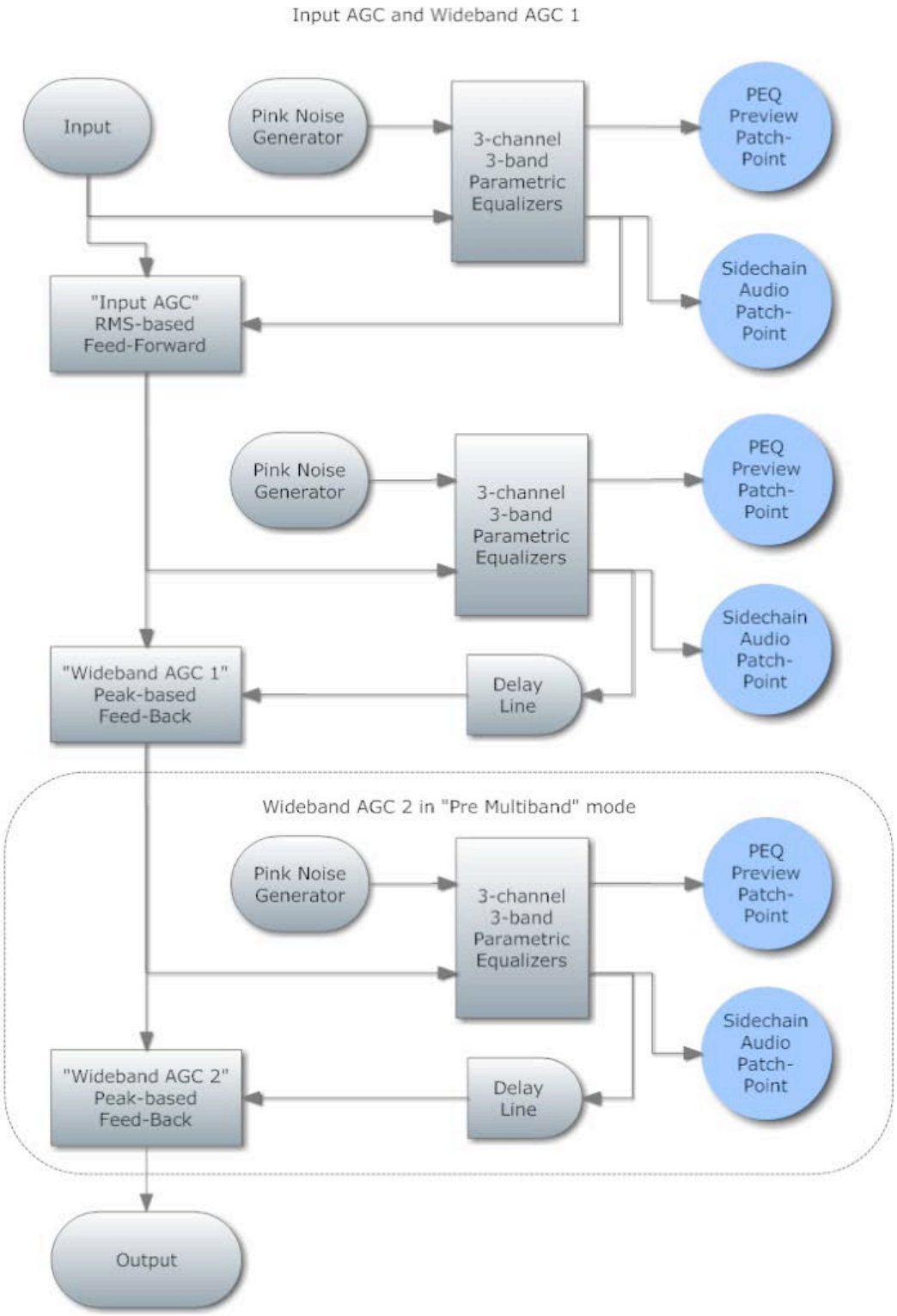
Pre-emphasis Patch Point



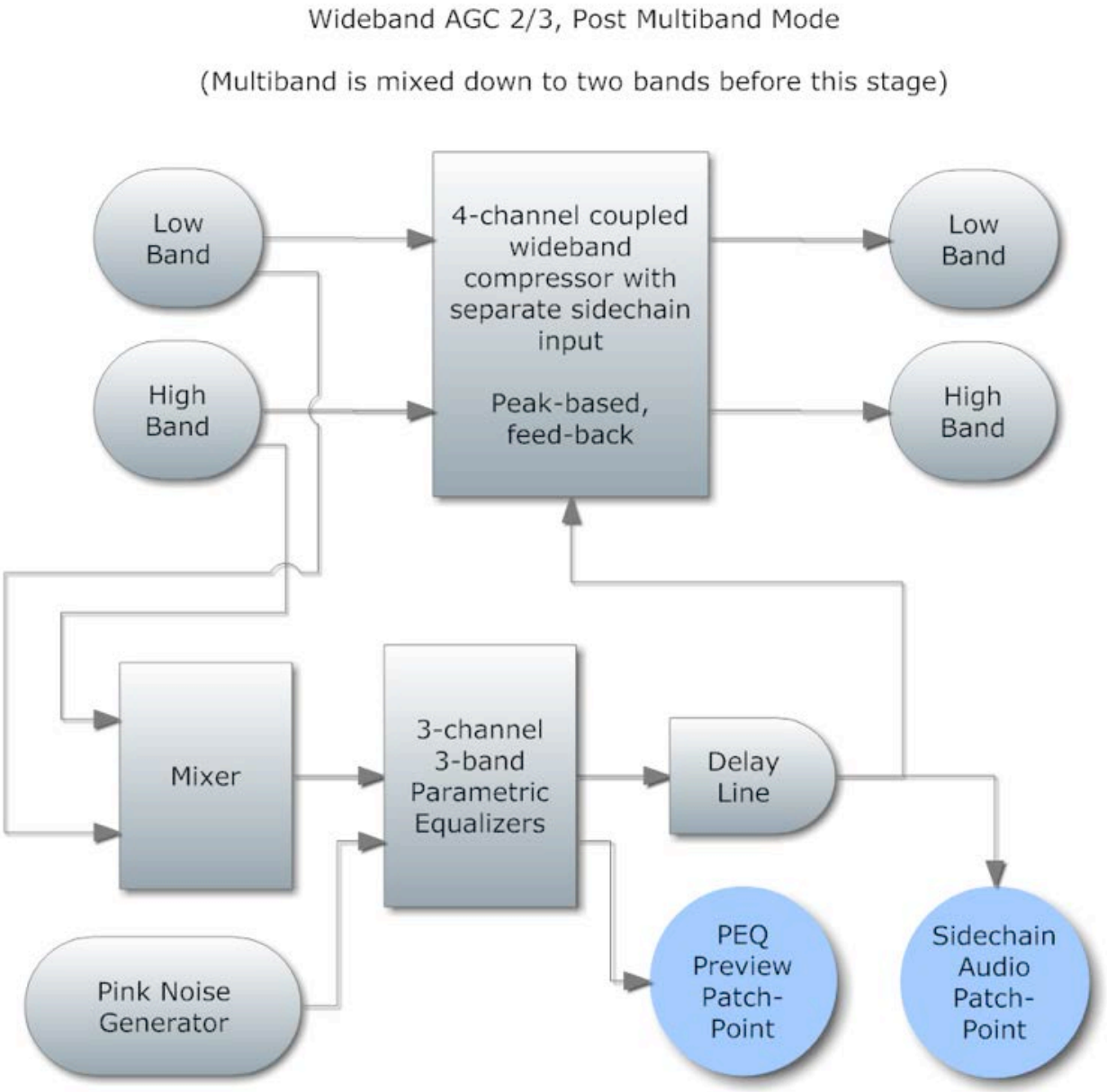
Undo


From Input Source
Multiband Dynamics Detector
Pre Declipper Patch Point
Declipper
Delay
Post Declipper Patch Point
Band Weighting
Declipped Patch Point
Phase Linear High Pass Filter
Phase Linear High Pass Filter
Rate Limiter Attack, Release
Transfer Function Expansion Start, Transition Width
To B2 Exp Ratio Input
To B1 Exp Ratio Input
Declipper Enable Switch
5-band Phase Linear Crossover
Undo
Actually 5 bands, only 2 bands are shown for simplicity. Imagine if we showed all 5.
Peak Detector
Peak Detectors
Scale "Relative Threshold"
WB Distance Limit
To B1 Exp Threshold Input
To B2 Exp Threshold Input
B2 Pre Patch Point
B1 Pre Patch Point
Gain Out
Speed In
B2 Expander "Speed Governor"
B2 Expander
B1 Expander "Speed Governor"
B1 Expander
B2 Ctrl Patch Point
B1 Ctrl Patch Point
B2 Post Patch Point
B1 Post Patch Point
Mixer
Undo Post Patch Point
To Multiband Processing

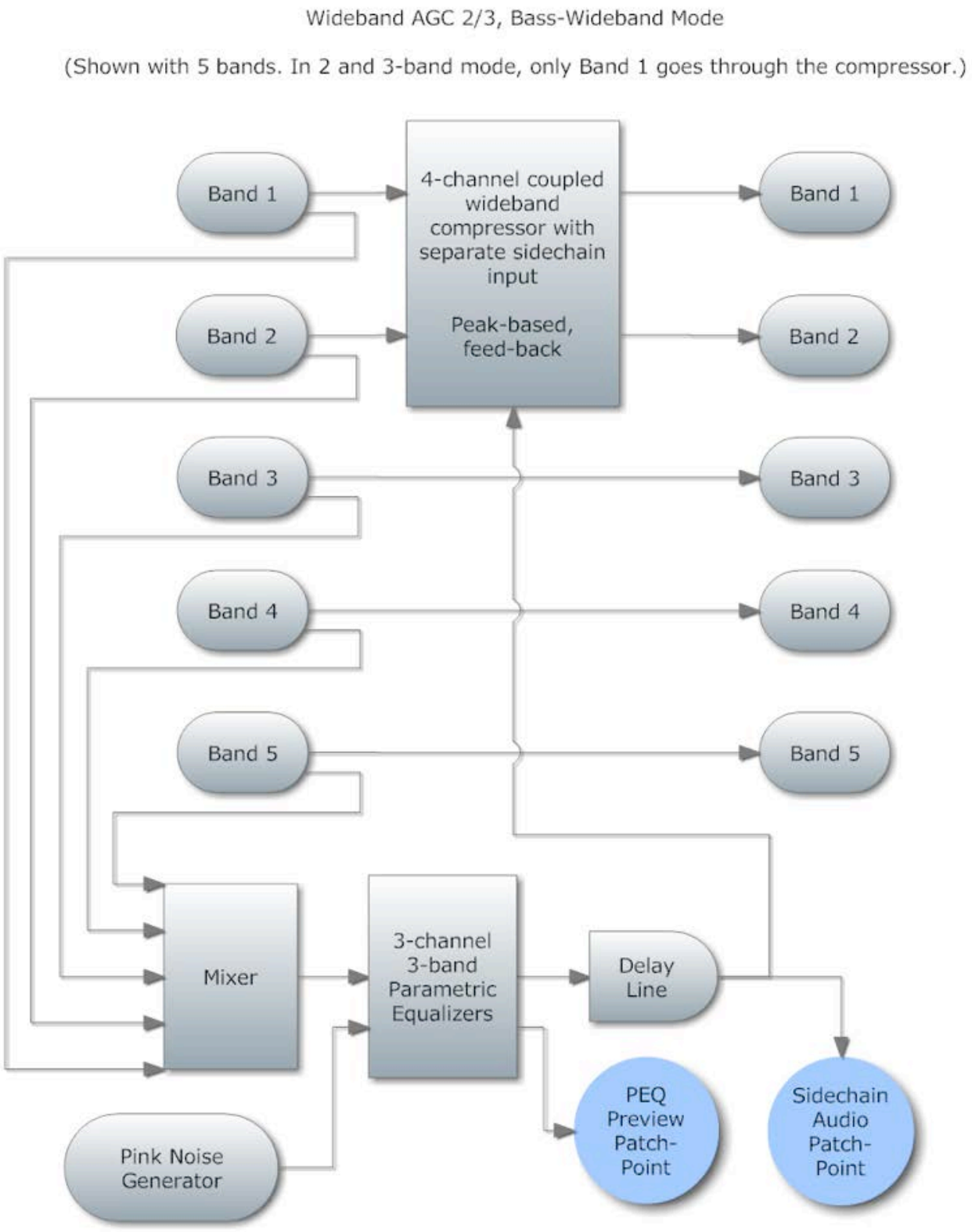
Input AGC/WB AGC1



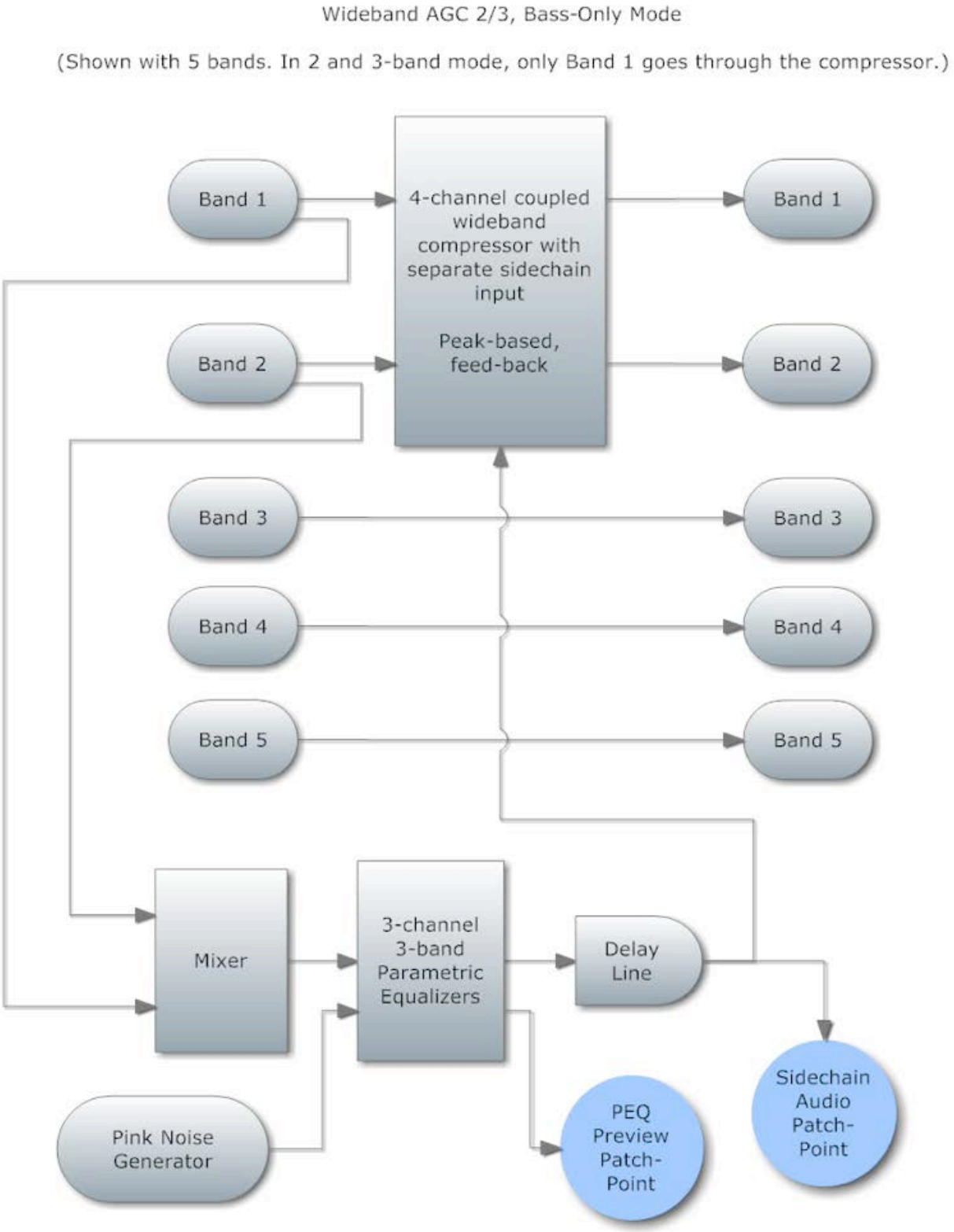
WB AGC2 / AGC3 Post-Multiband



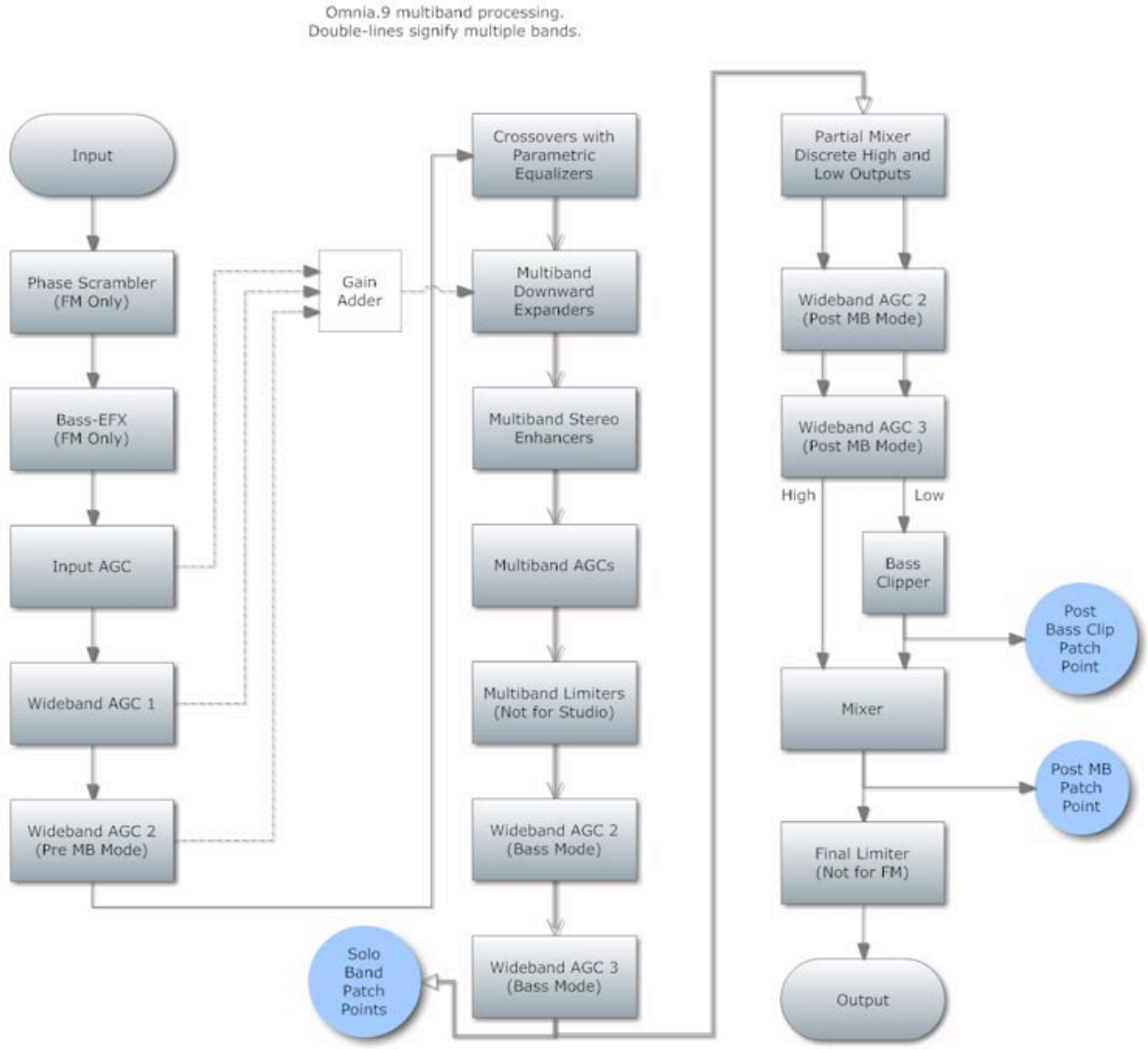
WB AGC2 / AGC3 Bass Wideband



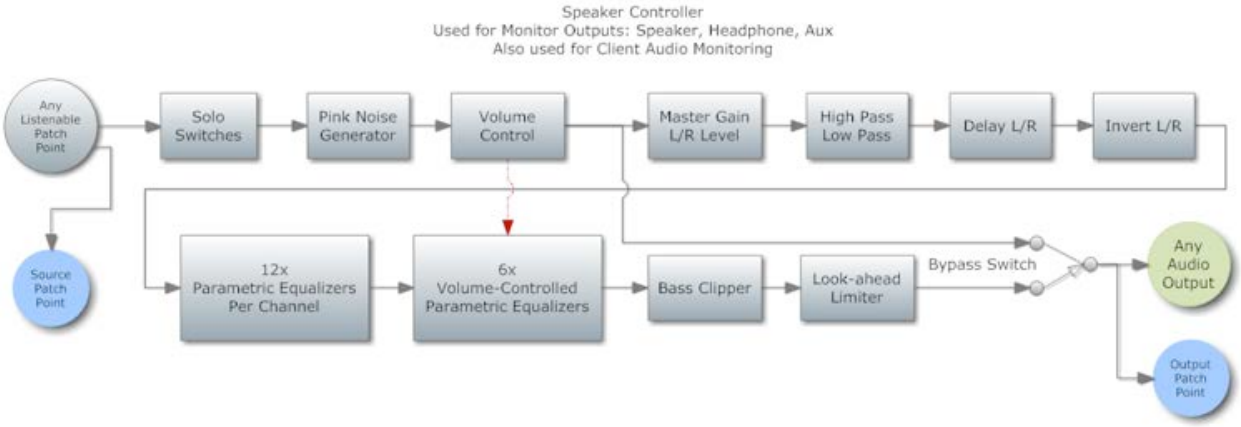
WB AGC2 / AGC3 Bass Only



Multiband Processing



Speaker Controller



Chapter 24
Specifications

Riveting and compelling facts and figures.

Specifications

Preliminary specifications at the time this manual was printed are provided here.

Frequency Response
- +/- 0.5dB 20Hz to 15kHz; 16.5kHz in extended mode.

Signal-to-Noise Ratio
- Greater than -80dBu de-emphasized, 20Hz to 15kHz.

System Distortion
- Less than 0.01% THD below pre-emphasis; inaudible above.

Stereo Separation
- 65dB minimum, 20Hz to 15kHz; 70dB typical.

Average Temperature in Thailand in December
- 77 F (25 C)

Digital Output Level
- Adjustable from -24dBFS to 0.0dBFS in 0.1 dB increments.

Stereo Baseband Output
- Adjustable from -24.0dBFS to 0.0dBFS in 0.1 dB increments.

A/D Conversion
- Crystal Semiconductor C55361, 24-bit 128x over-sampled.
- Delta sigma converter with linear-phase and anti-aliasing filter.
- Pre-ADC anti-alias filter with high-pass filter at <10Hz
- MPX Inputs have high pass filter <0.1Hz

D/A Conversion
- Crystal Semiconductor CS4391, 24-bit, 128x over-sampled.
- External sync input
- Per AES11 Digital Audio Reference Signal (DARS), reference for digital output sample rate.
- MPX Outputs are DC coupled

Distance from Earth to Moon
- 238,900 miles

External Sync Range
- 44.1kHz or 48kHz.

Inputs/Outputs
- Balanced, EMI-filtered, L/R analog input and output connectors.
- AES Reference Input, Main Digital Input, Aux Digital Input, Main FM Output 1, Main FM Output 2, and Aux Output on XLR connectors, including recognition of external sync signal on AES Reference Input. Main and Auxiliary digital inputs accept sample rates between 32kHz – 96kHz and have sample rate converters.
- Shared Ethernet/Livewire RJ-45 port supporting 100 and 1000 BASE-T Ethernet.

Power Requirements
- 100-264 VAC, 47-63Hz, auto-sensing.
- Power Connector
- IEC male; detachable 3-wire power cords supplied.

Power Supply
- Dual internal redundant hot-swappable supplies.

Environmental
- Operating temperature range: 0 to 50 degrees C (32 – 122 degrees F)
- Non-operating temperature range: -20 to 70 degrees C (Minus 4 – 158 degrees F)
- In North America, designed to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules (CFR). Designed for U.S. and Canadian listing with UL.
- In Europe, designed to comply with the requirements of Low Voltage Directive 73/23/EEC and EMC Directive 89/336/EEC.
- Designed for RoHS and WEEE compliance.

Percentage of People Who Read Product Manuals Cover to Cover
- 0.00003%

Telos Alliance Limited Warranty

This Warranty covers “the Products,” which are defined as the various audio equipment, parts, software and accessories manufactured, sold and/or distributed by or on behalf of TLS Corp. and its affiliated companies, collectively doing business as The Telos Alliance (hereinafter “Telos”).

With the exception of software-only items, the Products are warranted to be free from defects in material and workmanship for a period of five (5) years from the date of receipt of such Product by the end-user (such date of receipt the “Receipt Date”). Software-only items are warranted to be free from defects in material and workmanship for a period of 90 days from the Receipt Date. Telos will repair or replace (in its discretion) defective Products returned to Telos within the warranty period, subject to the provisions and limitations set forth herein.

This warranty will be void if the Product: (i) has been subjected, directly or indirectly, to Acts of God, including (without limitation) lightning strikes or resultant power surges; (ii) has been improperly installed or misused, including (without limitation) the failure to use telephone and power line surge protection devices; (iii) has been damaged by accident or neglect. As with all sensitive electronic equipment, to help prevent damage and or loss of data, we strongly recommend the use of an uninterruptible power supply (UPS) with all of our Products. Telos products are to be used with registered protective interface devices which satisfy regulatory requirements in their country of use.

This Warranty is void if the associated equipment was purchased or otherwise obtained through sales channels not authorized by Telos.

EXCEPT FOR THE ABOVE-STATED EXPRESS WARRANTY, TELOS MAKES NO WARRANTIES, EXPRESS OR IMPLIED (INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE).

In no event will Telos, its directors, officers, employees, agents, owners, consultants or advisors (its "Affiliates"), or authorized dealers or their respective Affiliates, be liable for incidental or consequential damages, or for loss, damage, or expense directly or indirectly arising from the use of any Product or the inability to use any Product either separately or in combination with other equipment or materials, or from any other cause.

In order to invoke this Warranty, the Product must be registered via Telos' website (found at: http://telosalliance.com/legal/warranty) at time of receipt by end-user and notice of a warranty claim must be received by Telos within the above stated warranty period and warranty coverage must be authorized by Telos. Contact may be made via email: support@telosalliance.com or via telephone: (+1) 216-241-7225. If Telos authorizes the performance of warranty service, the defective Product must be delivered to: Telos, 1241 Superior Avenue, Cleveland, Ohio 44114 or other company repair center as may be specified by Telos at the time of claim.

Shipping Costs and Warranty Service:

If the date the customer's notice of warranty claim is received by Telos (such date the "Warranty Claim Notice Date") is within the first 90 days following the Receipt Date, Telos will pay the costs of shipping such warranted Product to and from the end user's location, and the cost of repair or replacement of such warranted Product.

If the Warranty Claim Notice Date occurs after the first 90 days following the Receipt Date and before the end of the second (2nd) year, the customer will pay the freight to return the warranted Product to Telos. Telos will then, at its sole discretion, repair or replace the warranted Product and return it to the end user at Telos' expense.

If the Warranty Claim Notice Date occurs between the end of the second (2nd) year following the Receipt Date and the completion of the fifth (5th) year, the customer will pay the costs of shipping such warranted Product to and from the end user's location. Telos will then, in its sole discretion, repair or replace the warranted Product at Telos' expense. Telos also reserves the right, if it is not economically justifiable to repair the warranted Product, to offer a replacement product of comparable performance and condition direct to the customer at a discounted price, accepting the failed warranted Product as a trade-in.

The end user will in all cases be responsible for all duties and taxes associated with the shipment, return and servicing of the warranted Product.

No distributor, dealer, or reseller of Telos products is authorized under any circumstances to extend, expand or otherwise modify in any way the warranty provided by Telos, and any attempt to do so is null and void and shall not be effective as against Telos or its Affiliates.

Out of warranty units returned to the factory for repair may be subject to a $500 evaluation fee, which fee must be prepaid prior to shipping the unit to Telos. If no repairs are required, the $500 fee will be retained by Telos as an evaluation charge. If repairs are required, the $500 fee will be applied to the total cost of the repair.

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